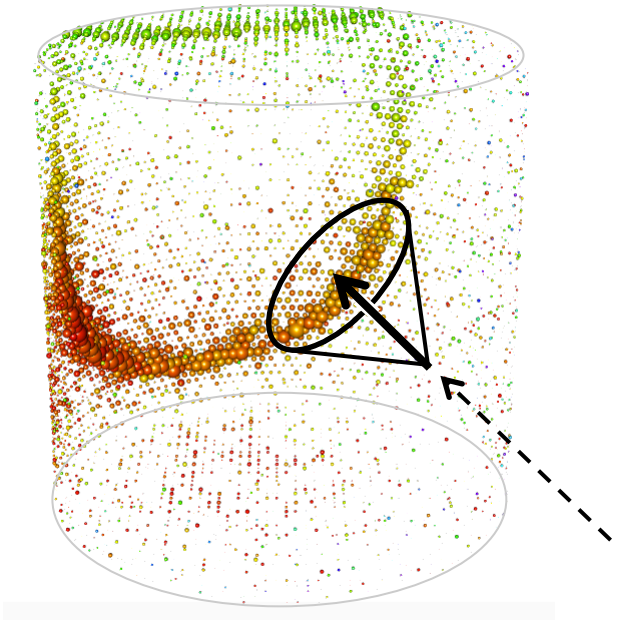
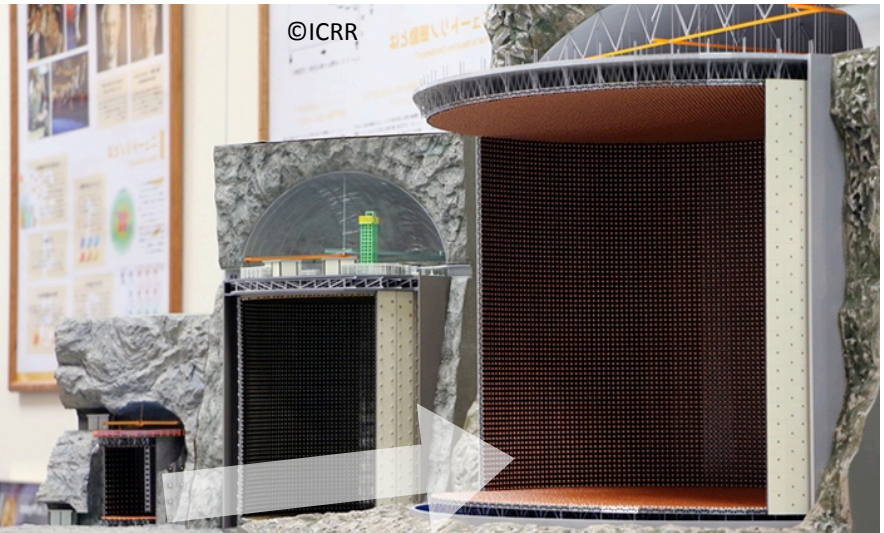
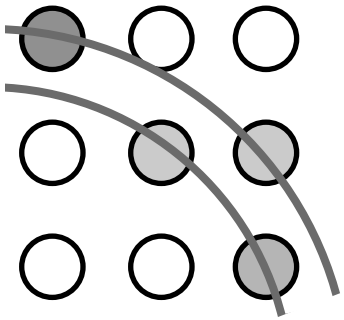
Can we improve water-Cherenkov detectors?





- 40% photo-coverage
  → 60% photons lost
- All PMTs outside the ring are “unused”



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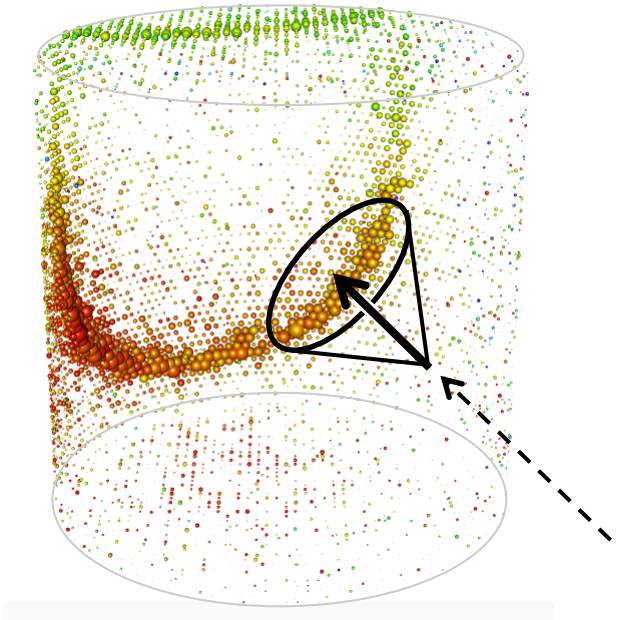

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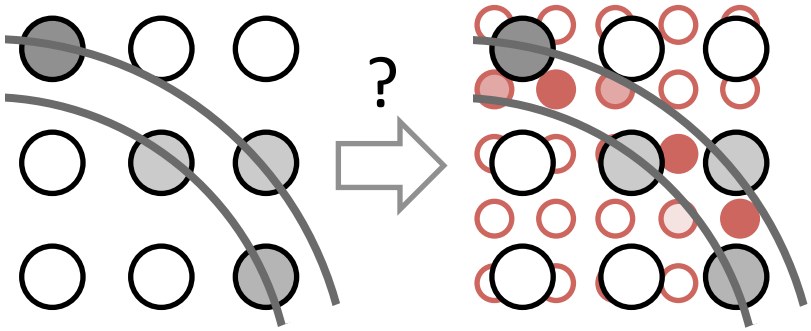
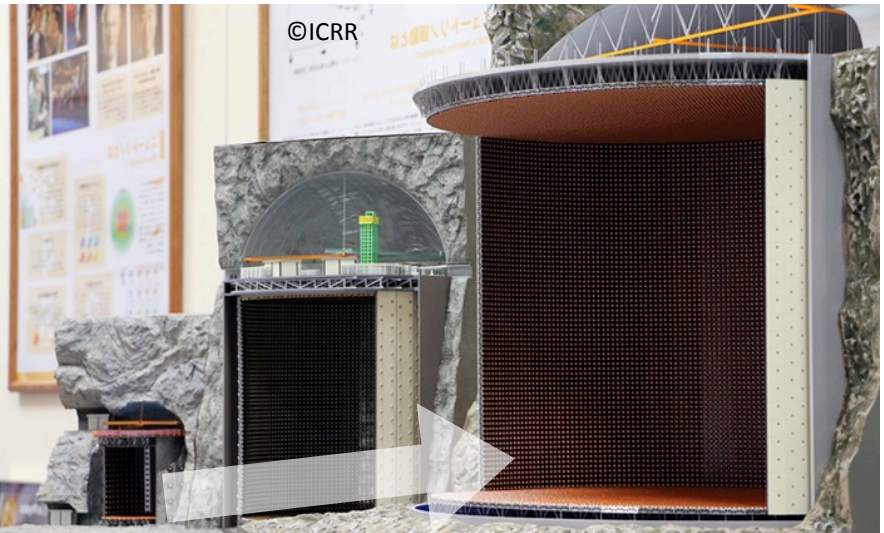
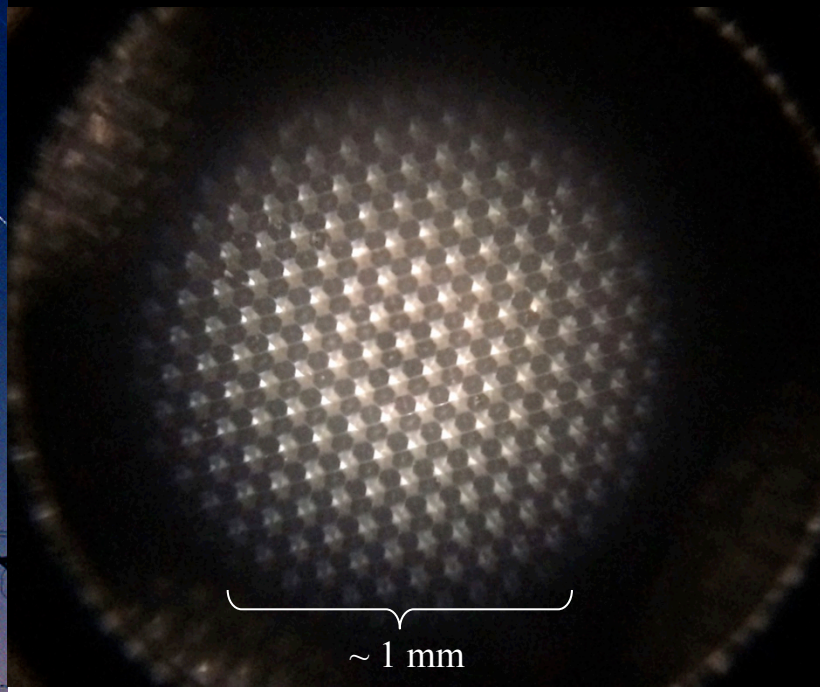




Can we map lost photons to other side of tank?

Retro-reflectors

© James Jordan (Flickr)



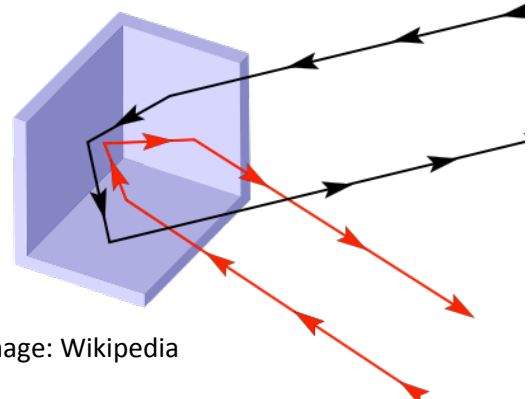
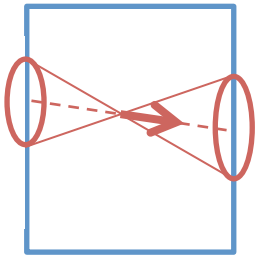
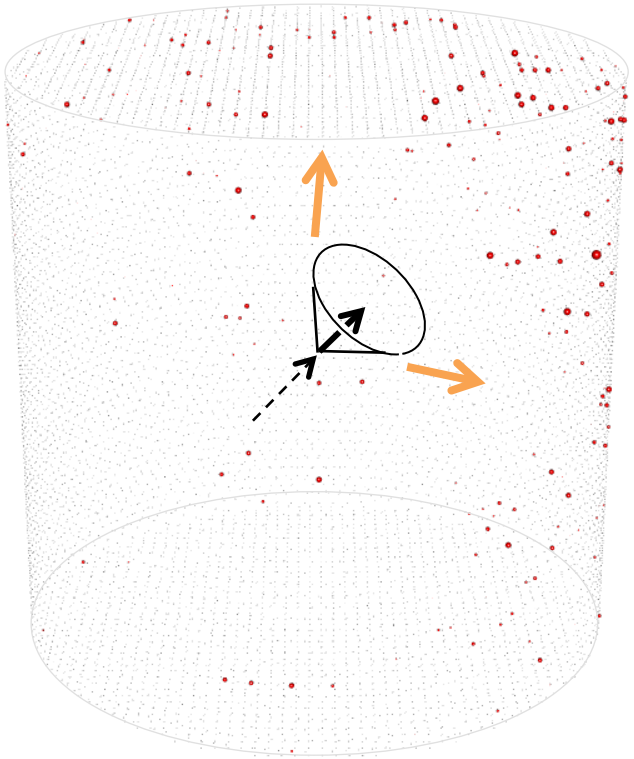


Image: Wikipedia

A novel water-Cherenkov detector design with **retro-reflectors** to produce **antipodal rings**





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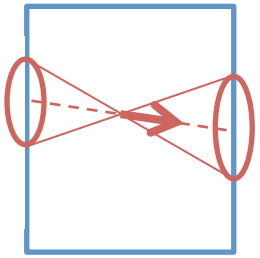

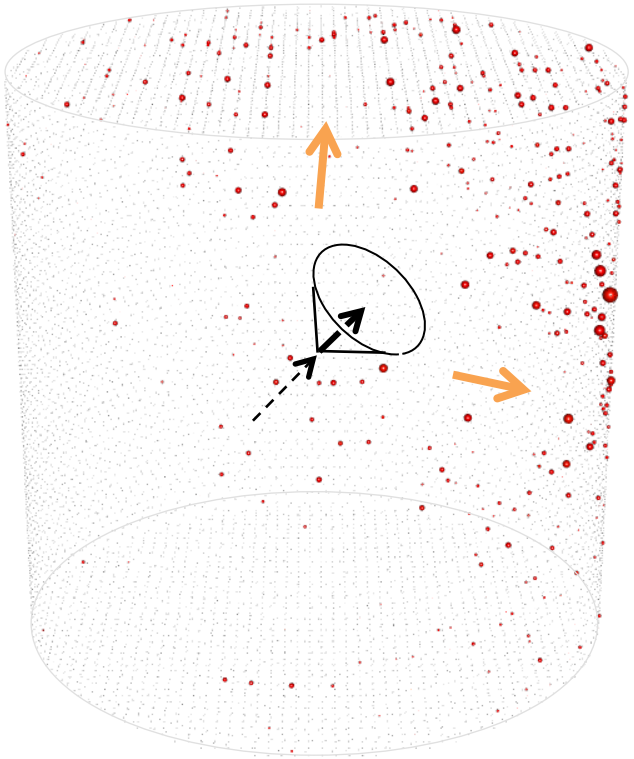

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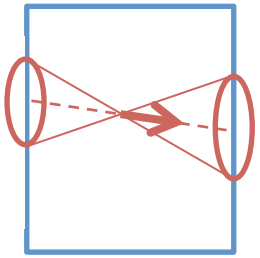

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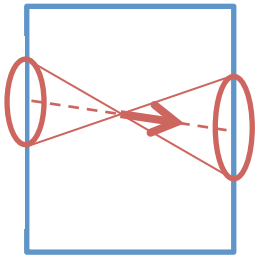

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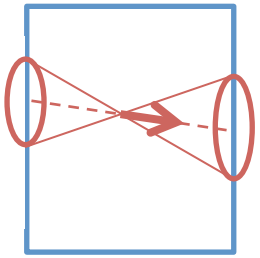

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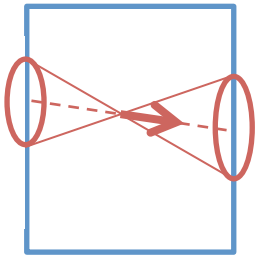

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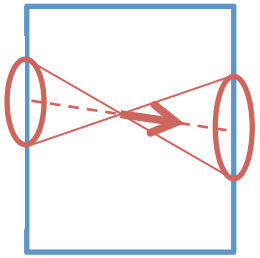

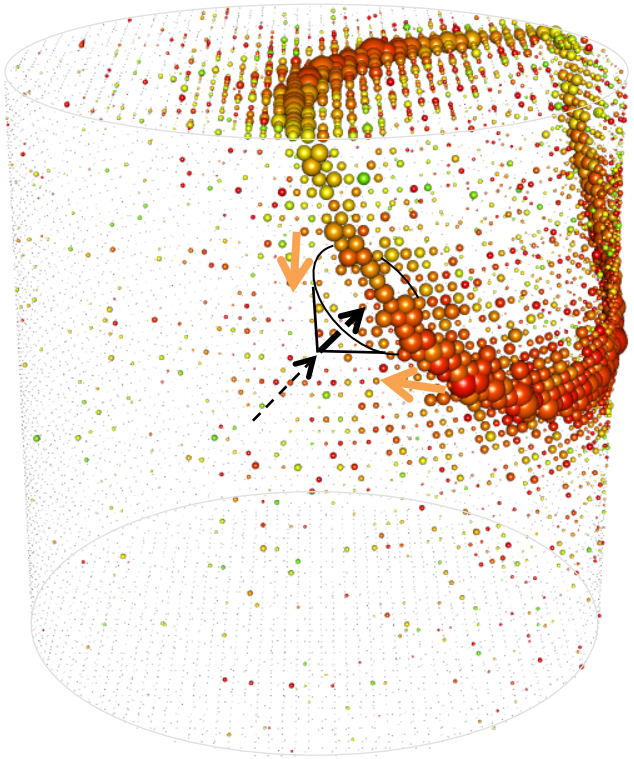

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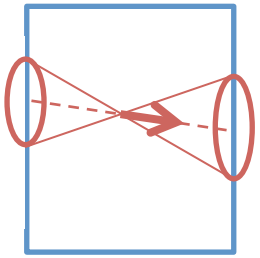

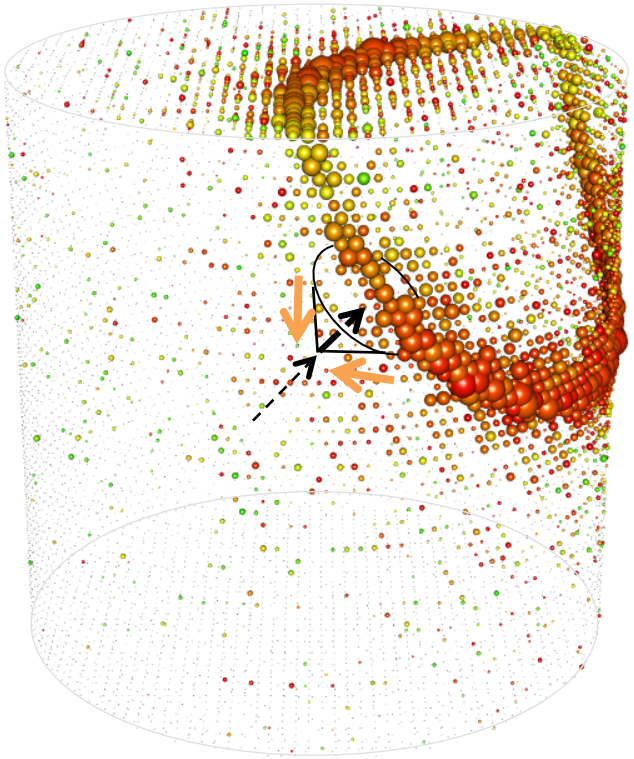

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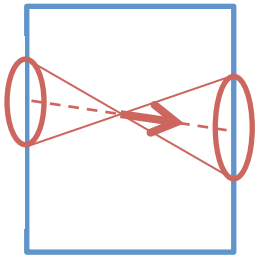

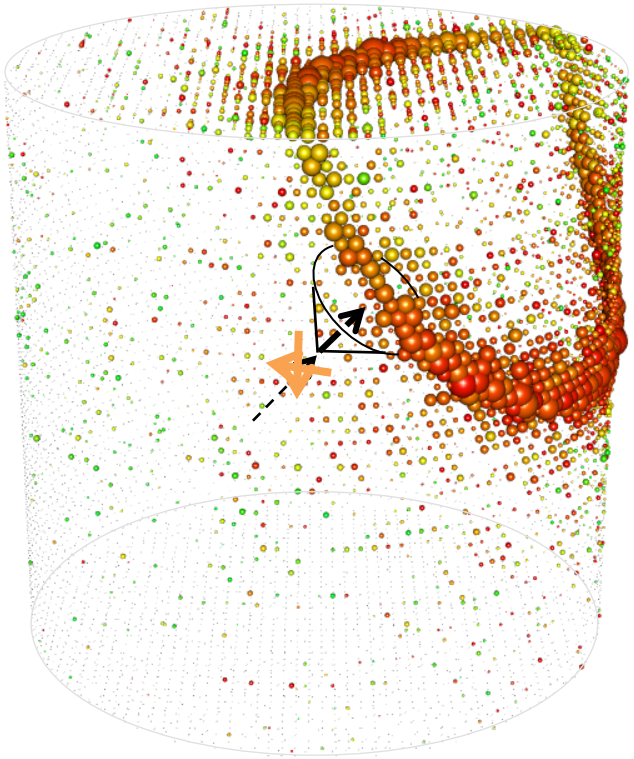

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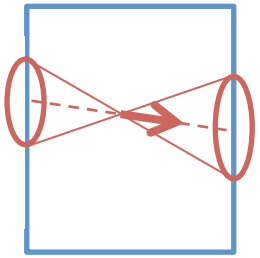

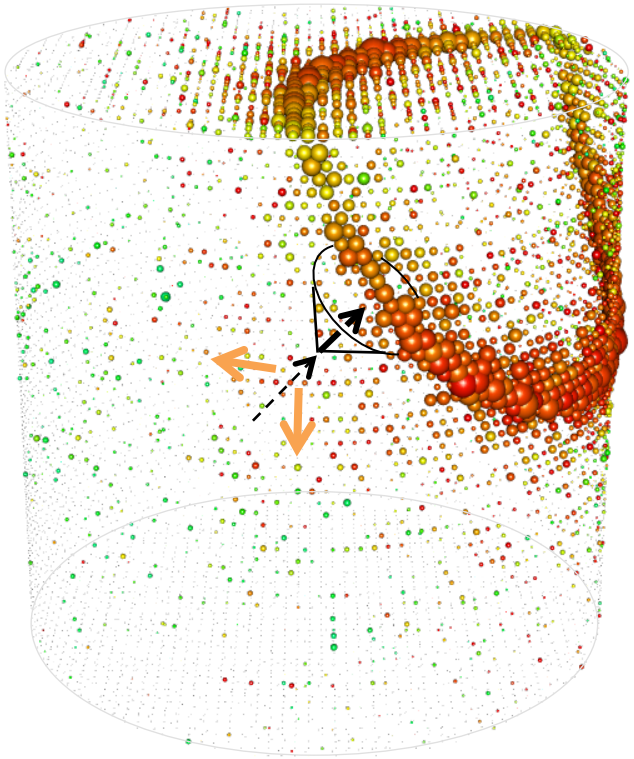

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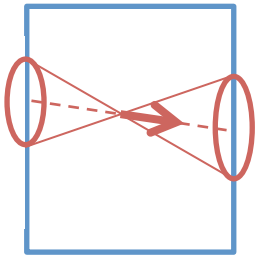

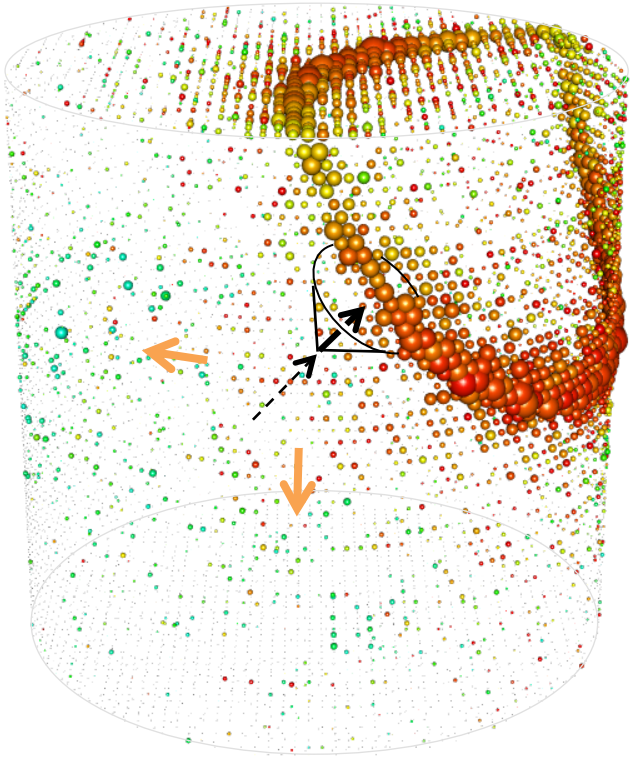

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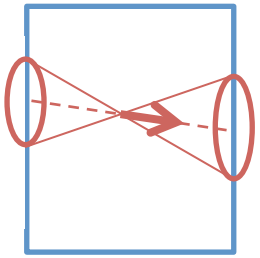

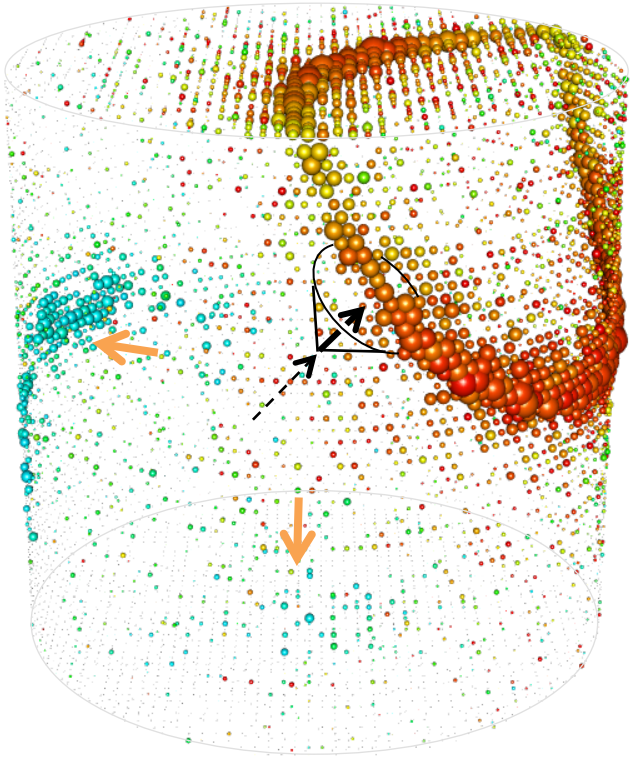

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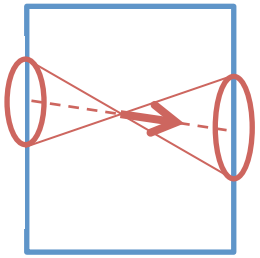

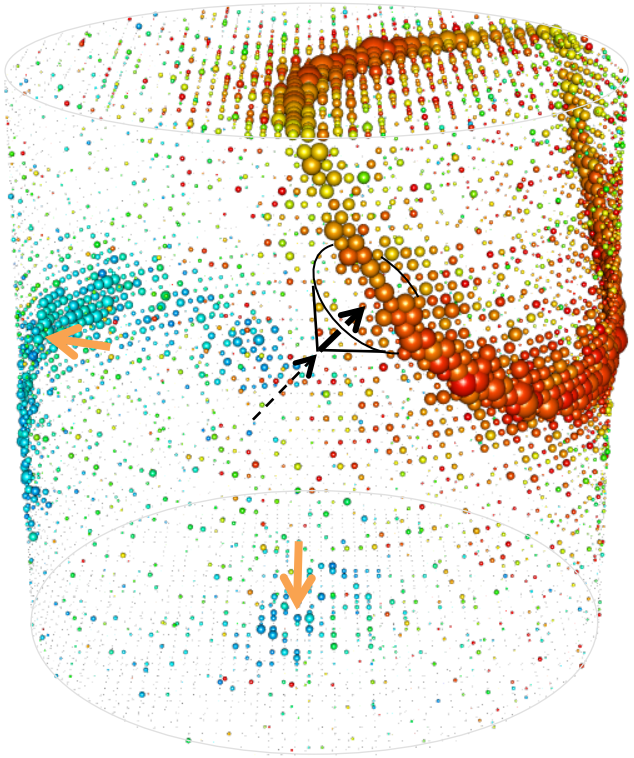

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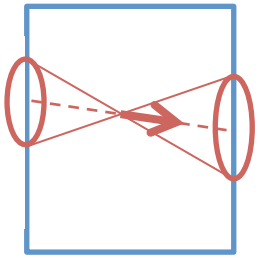

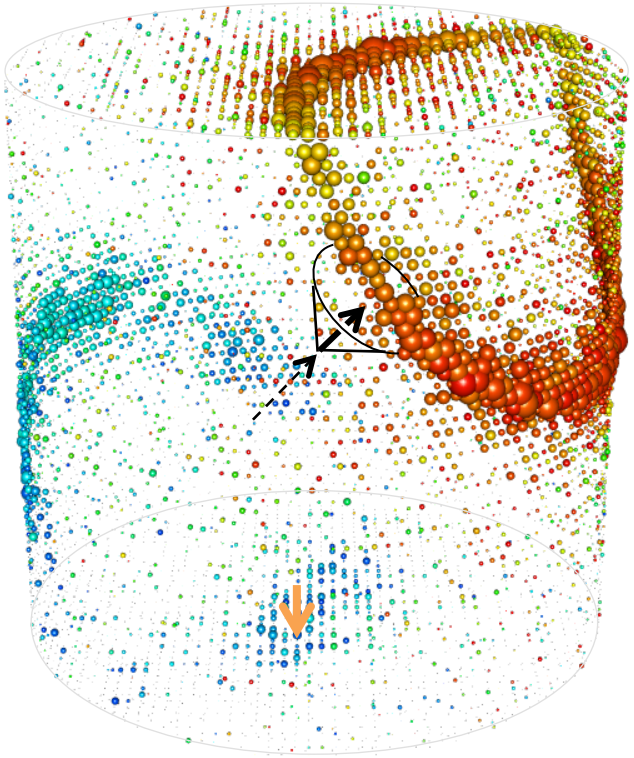

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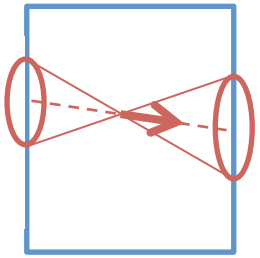

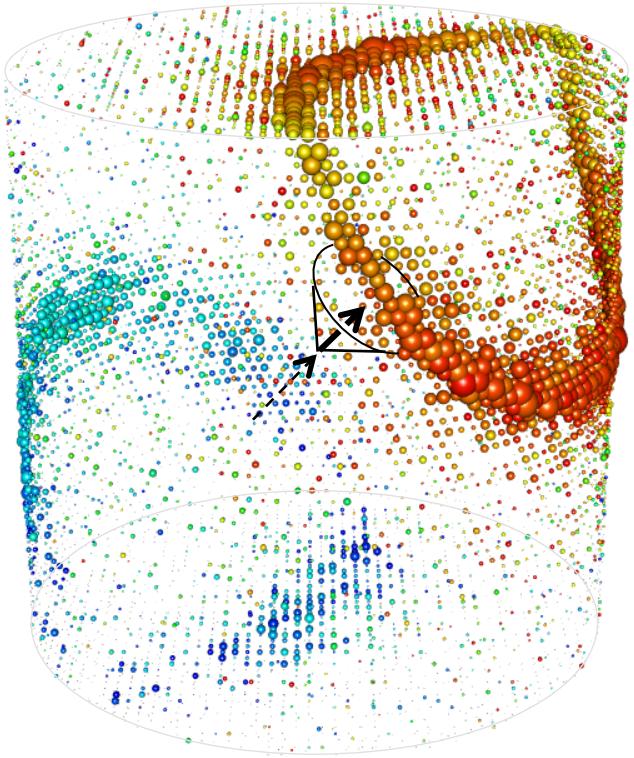

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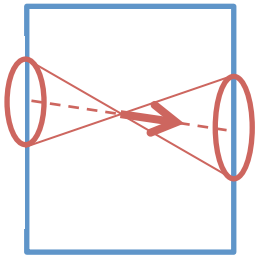

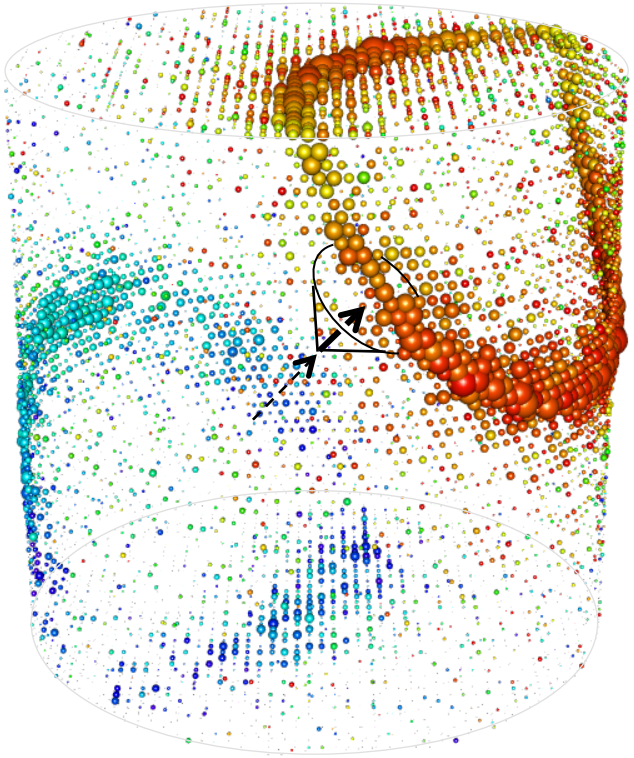

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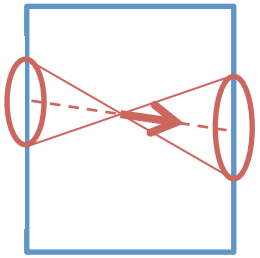

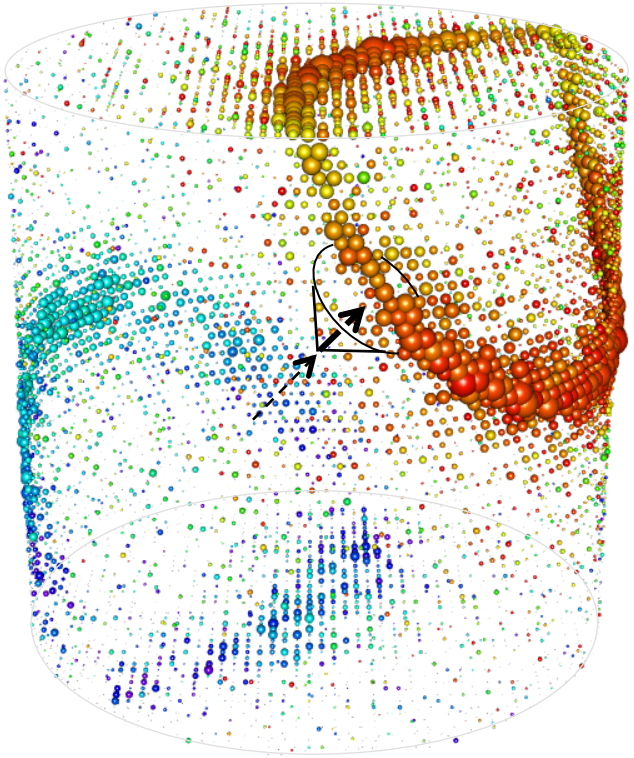

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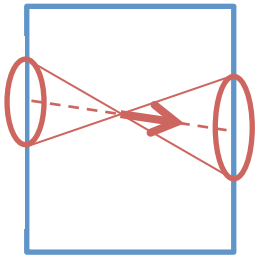

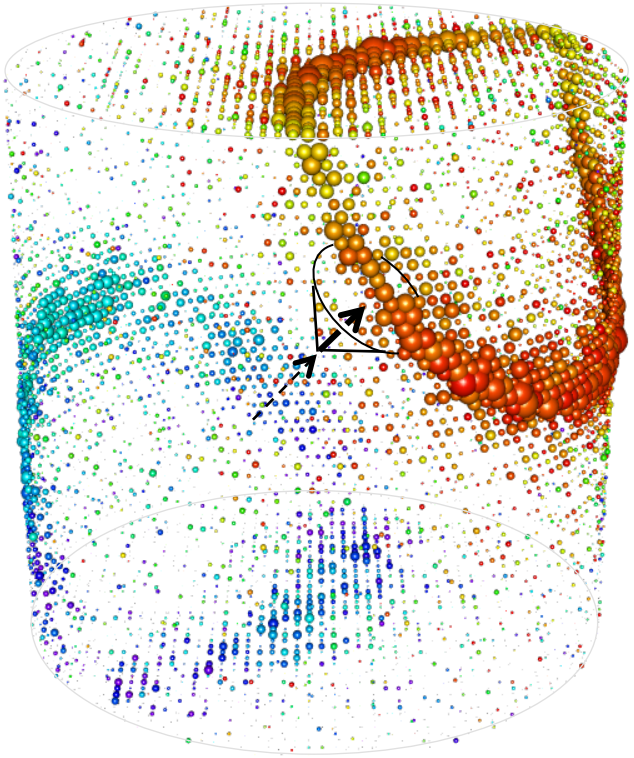

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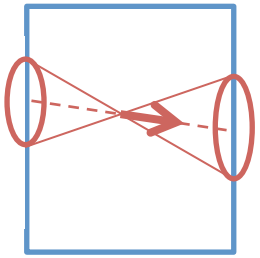

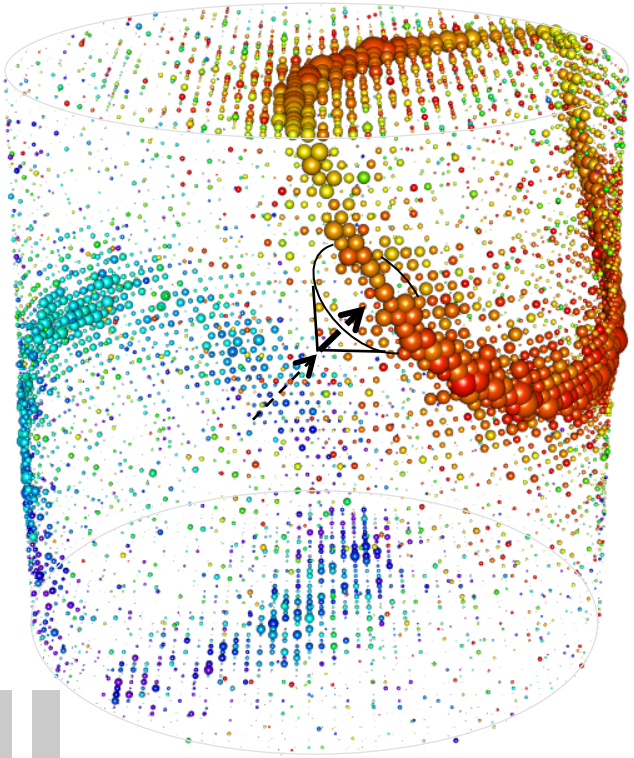

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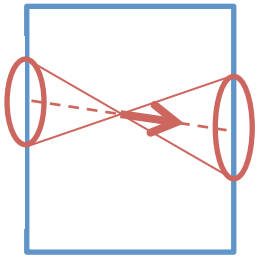

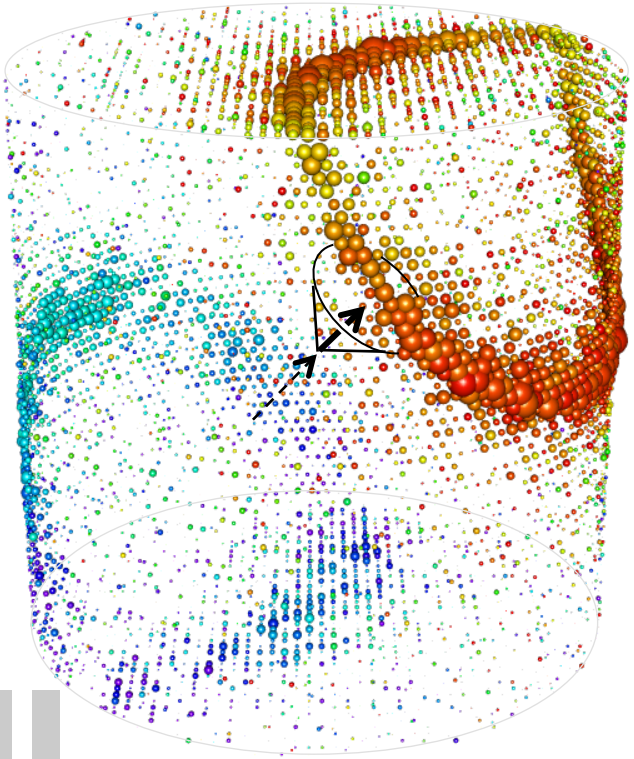

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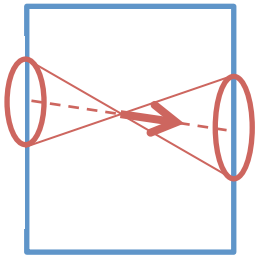

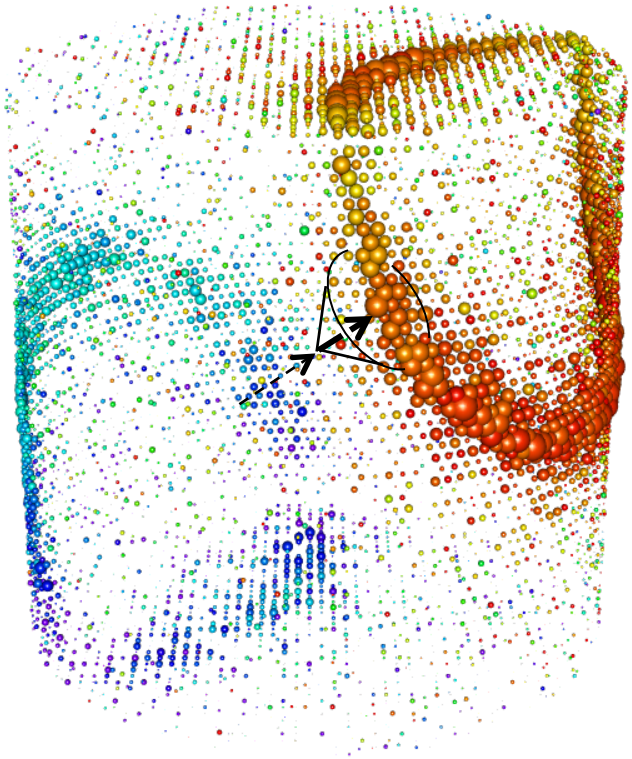

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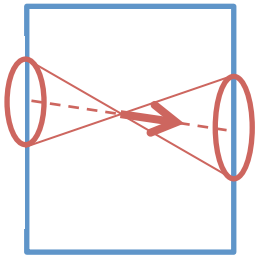

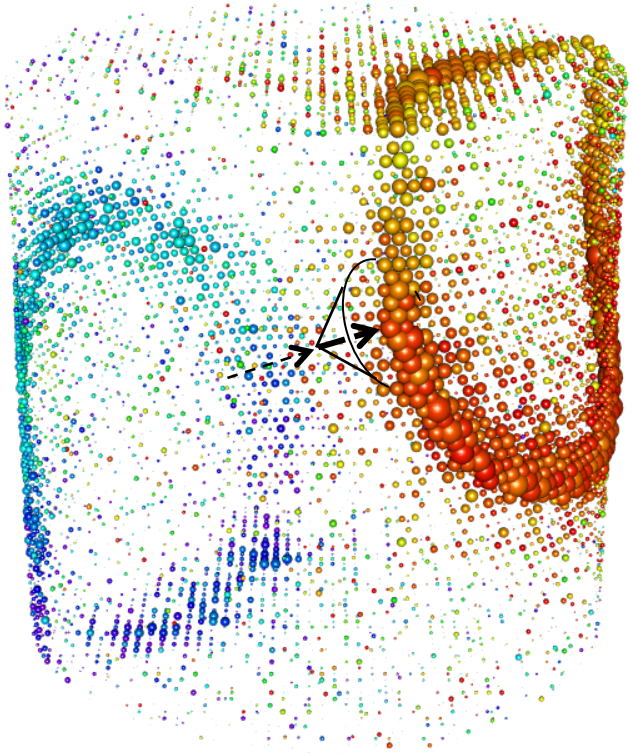

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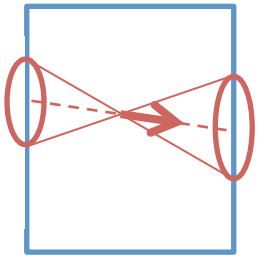

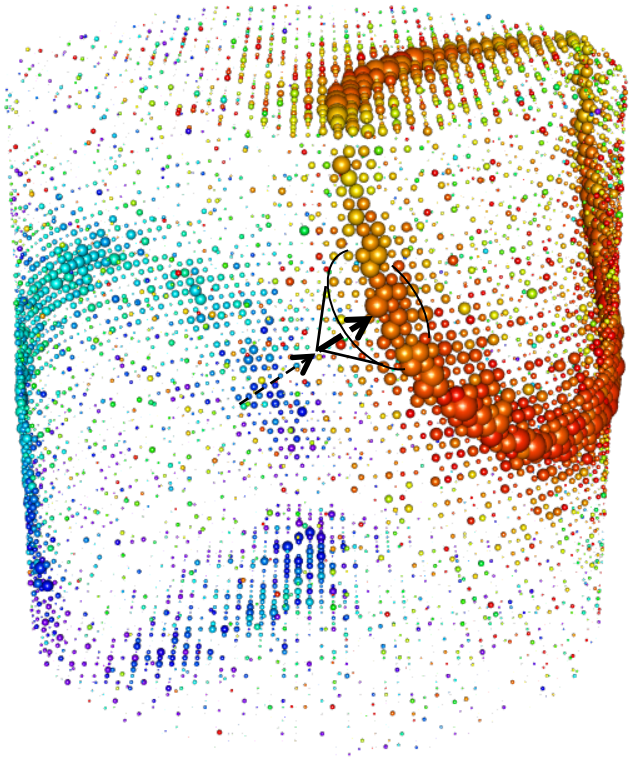

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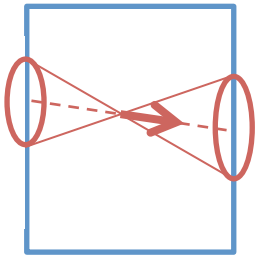

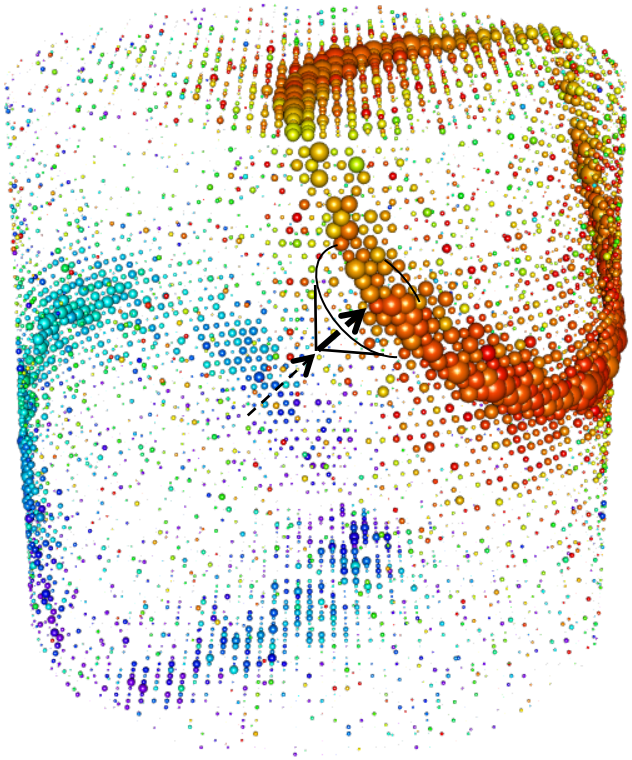

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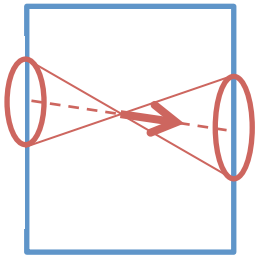

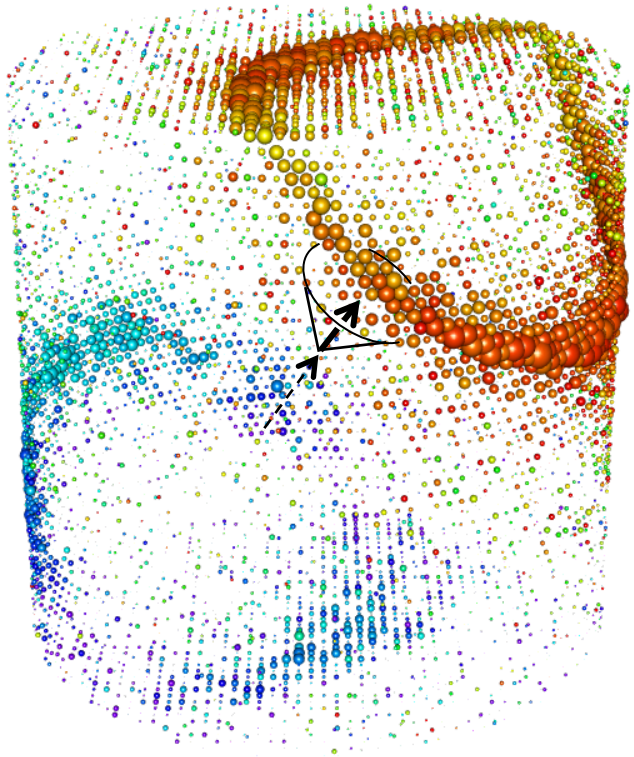

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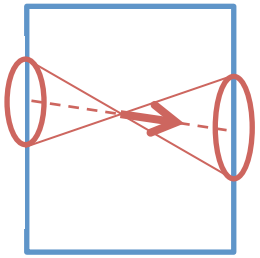

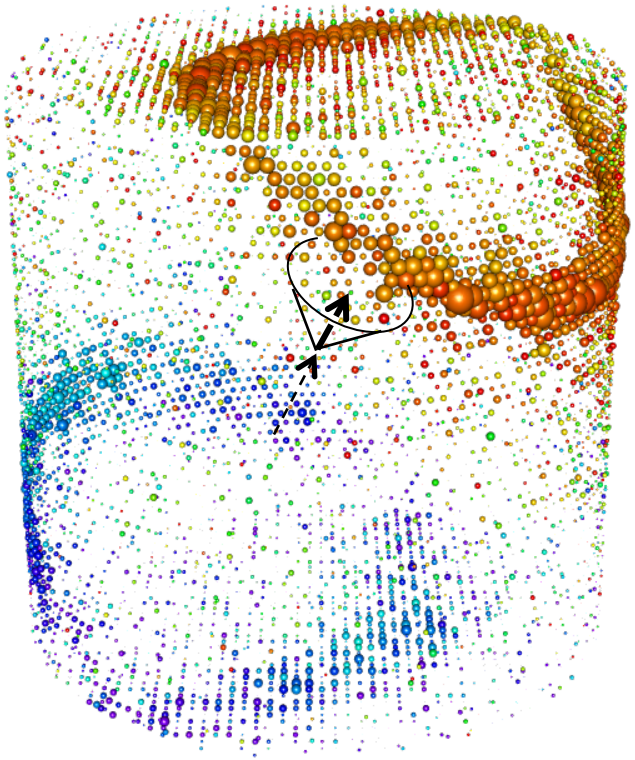

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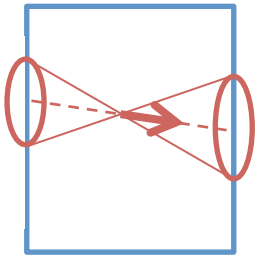

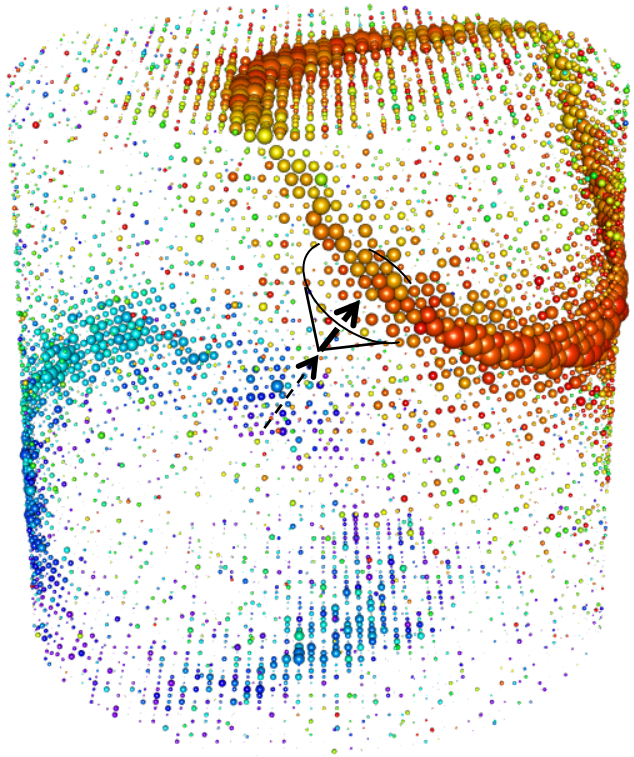

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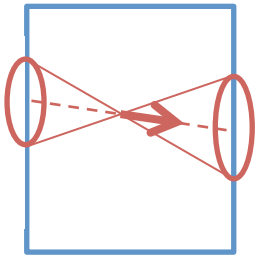

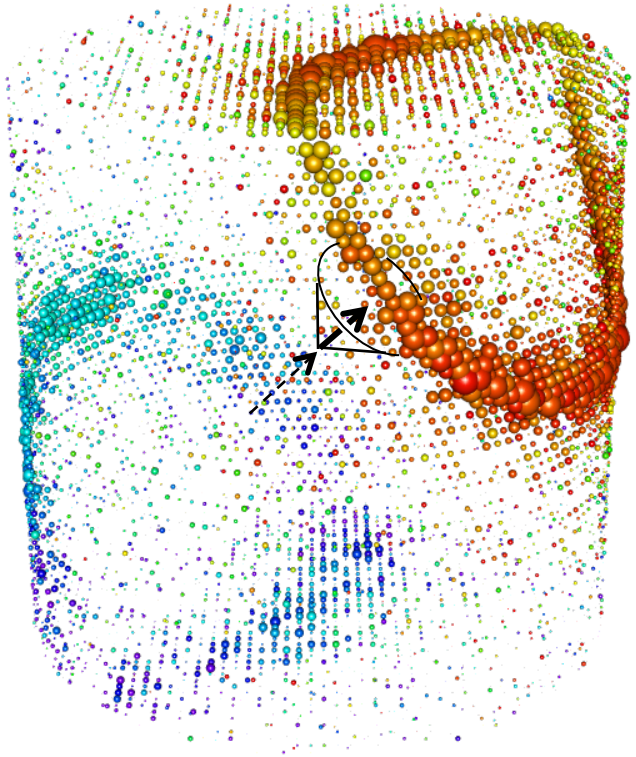

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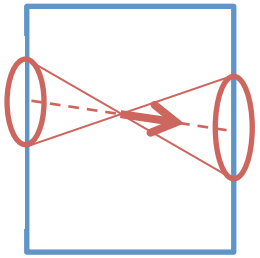

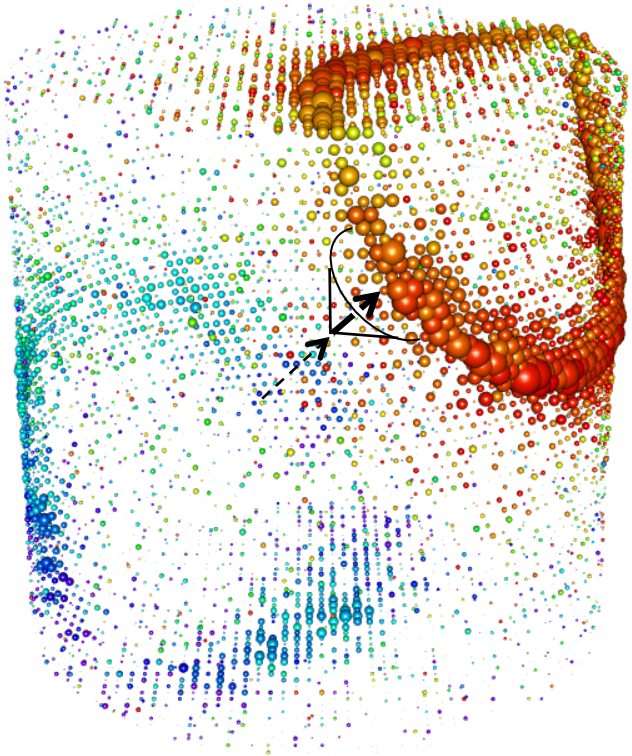

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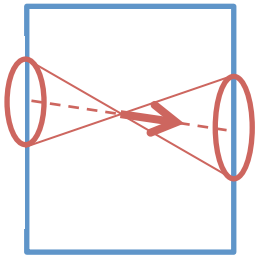

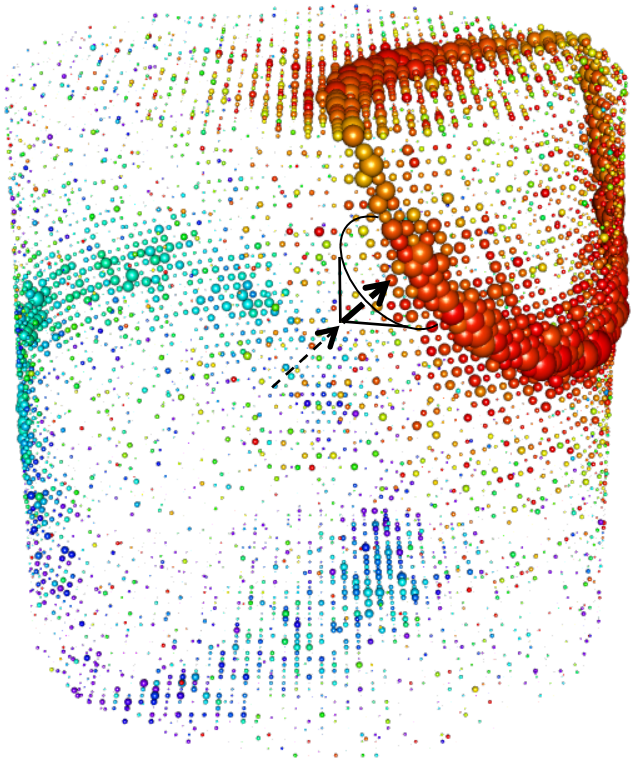

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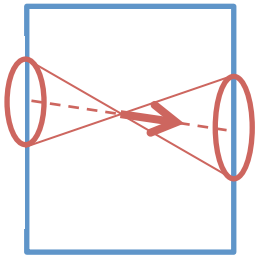

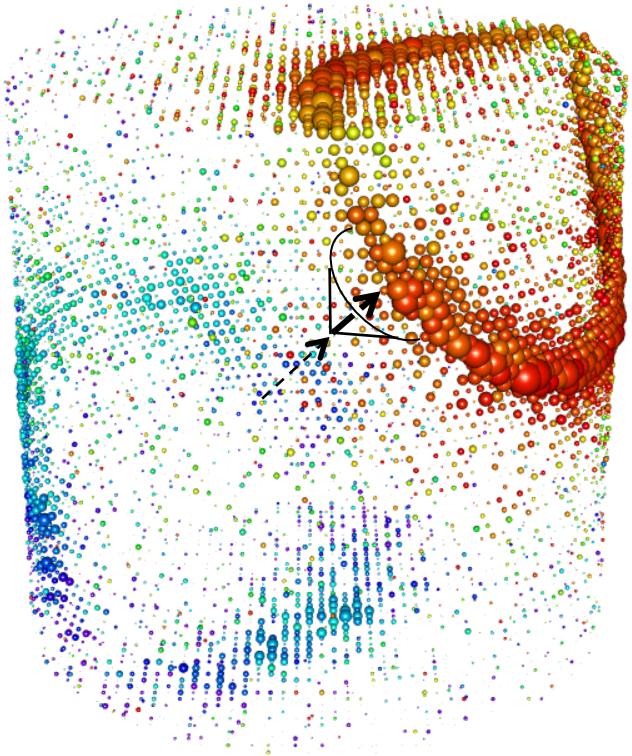

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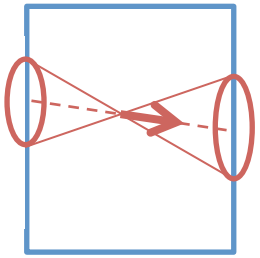

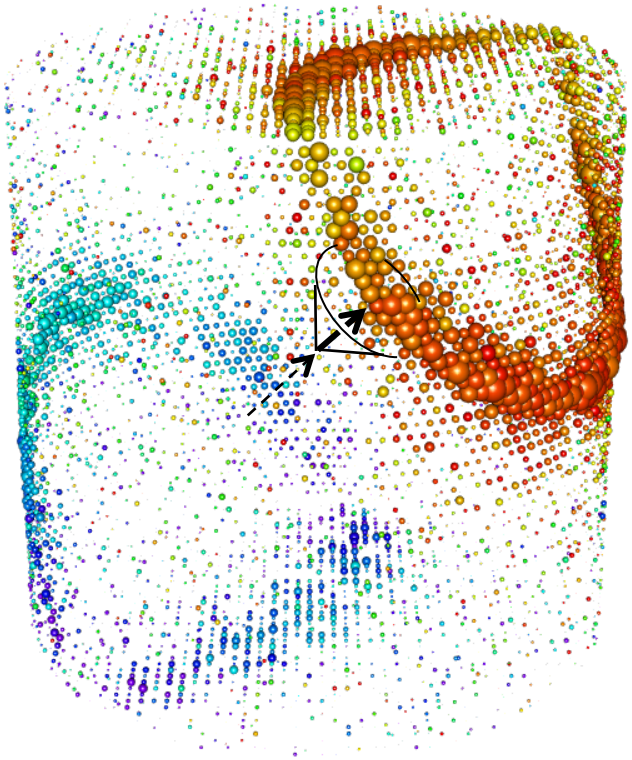

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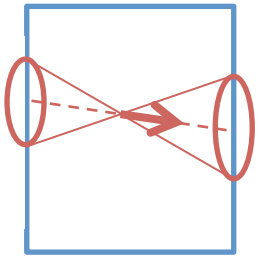

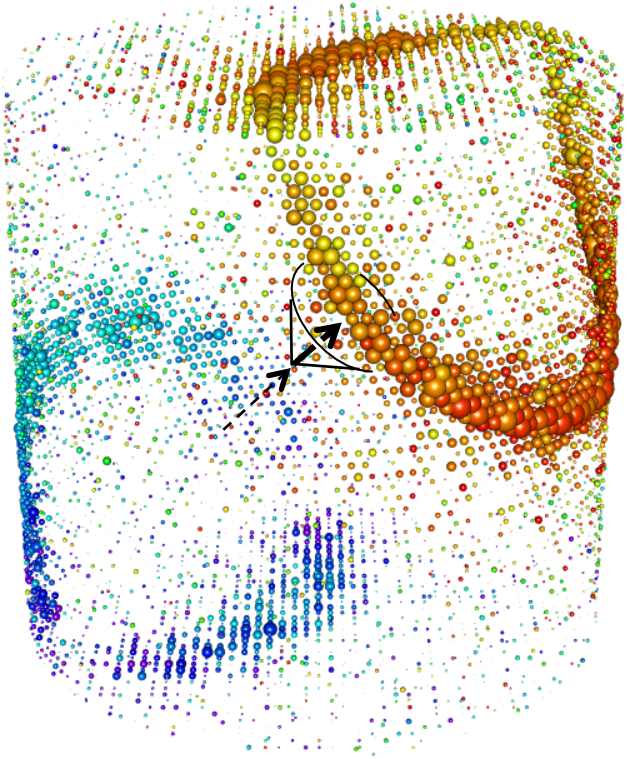

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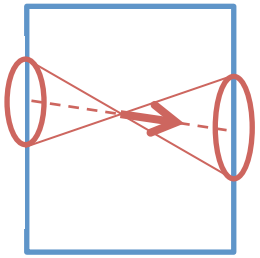

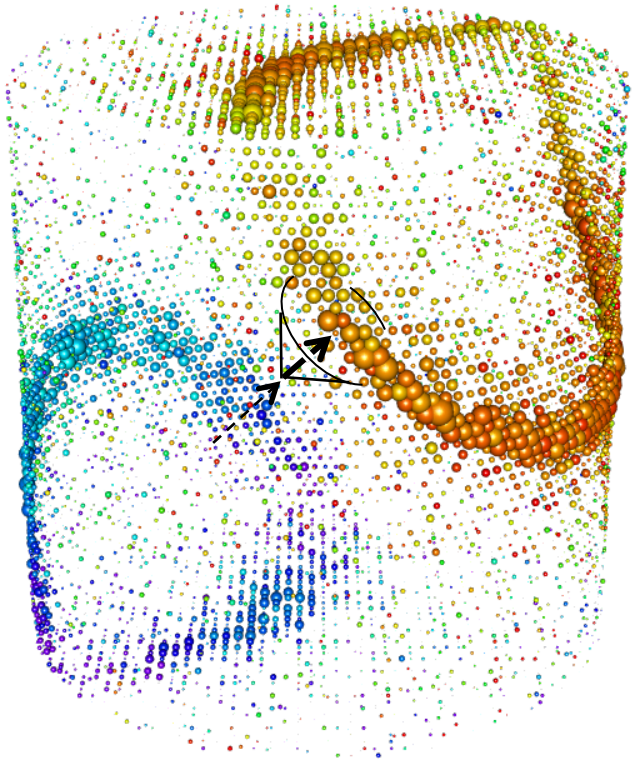

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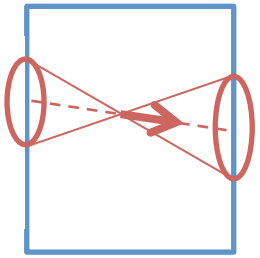

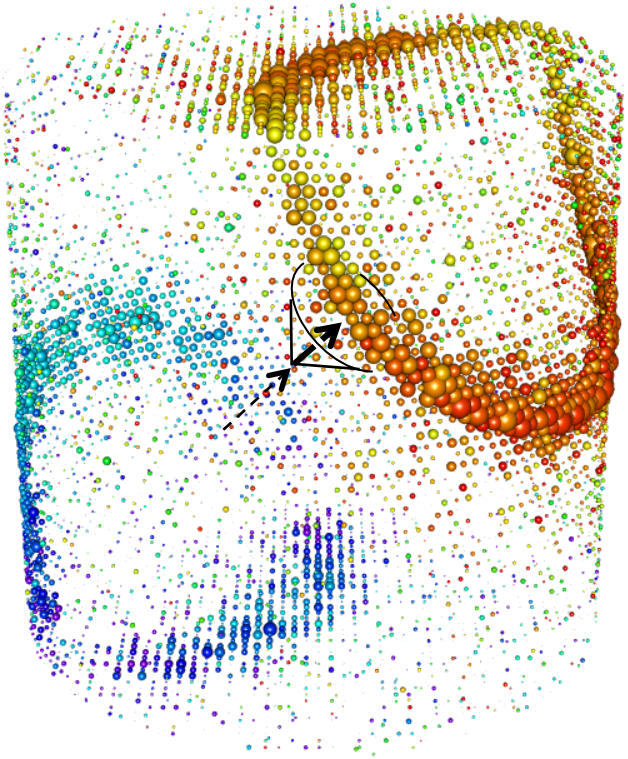

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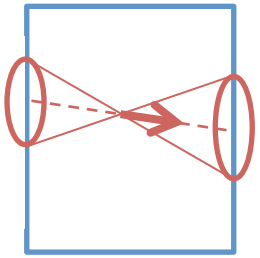

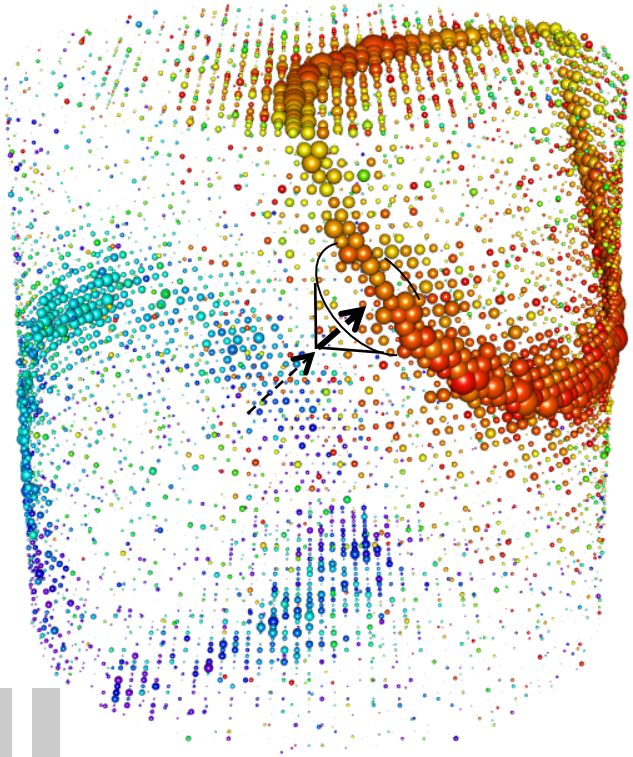

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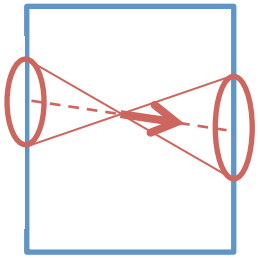
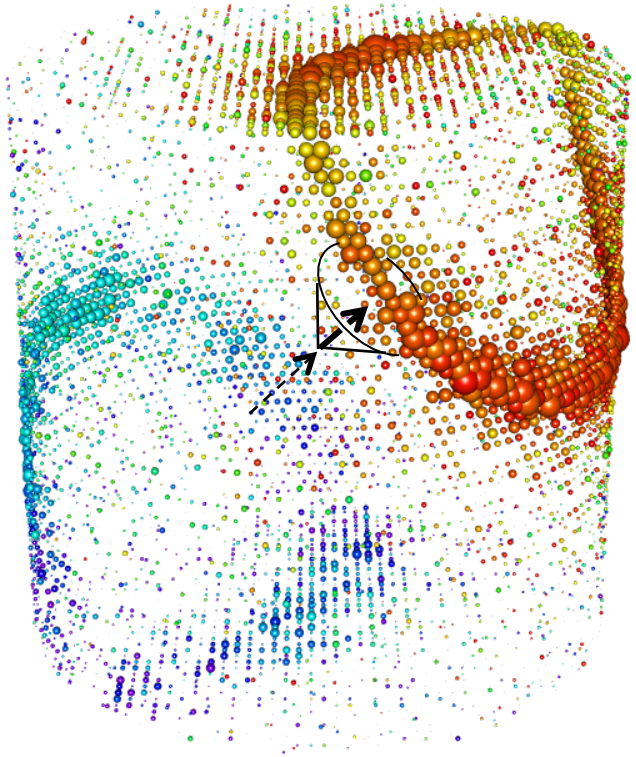
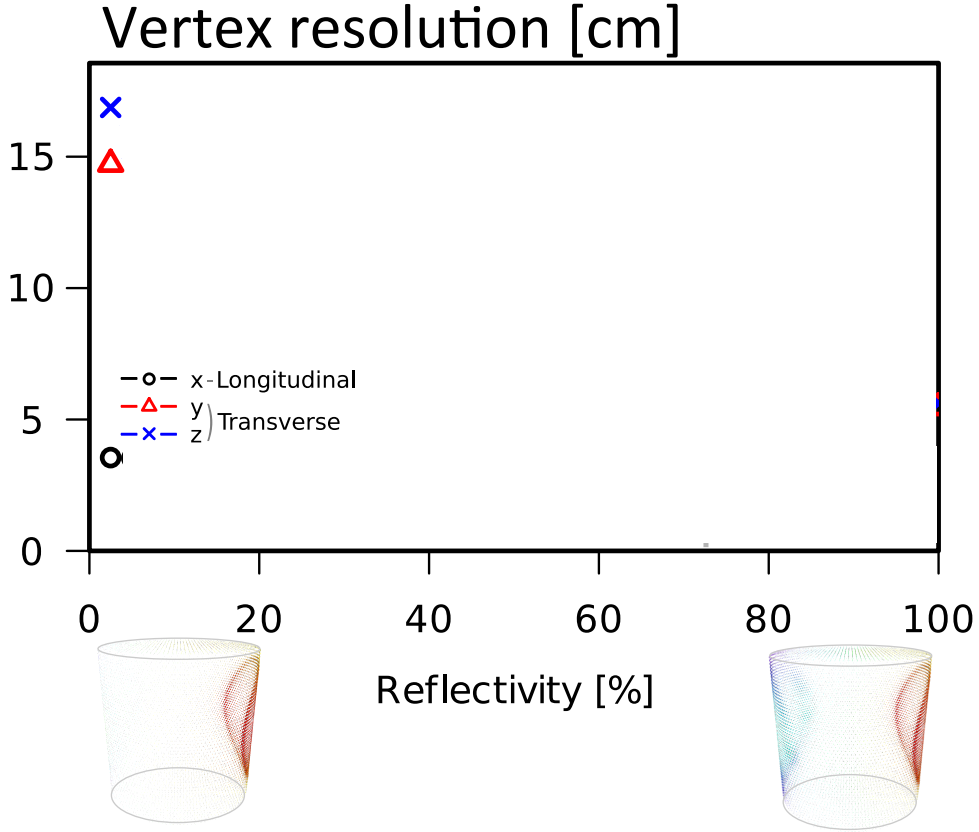


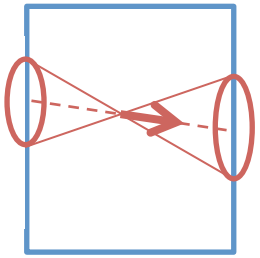


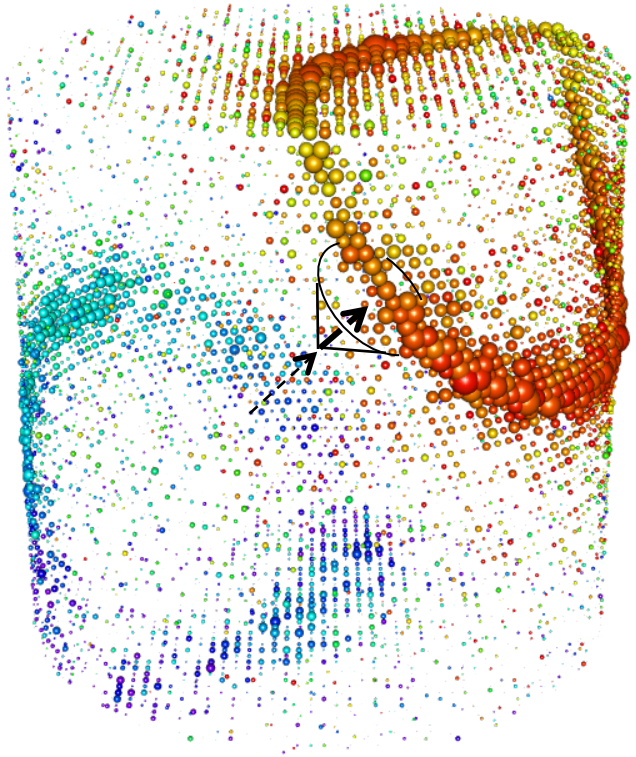


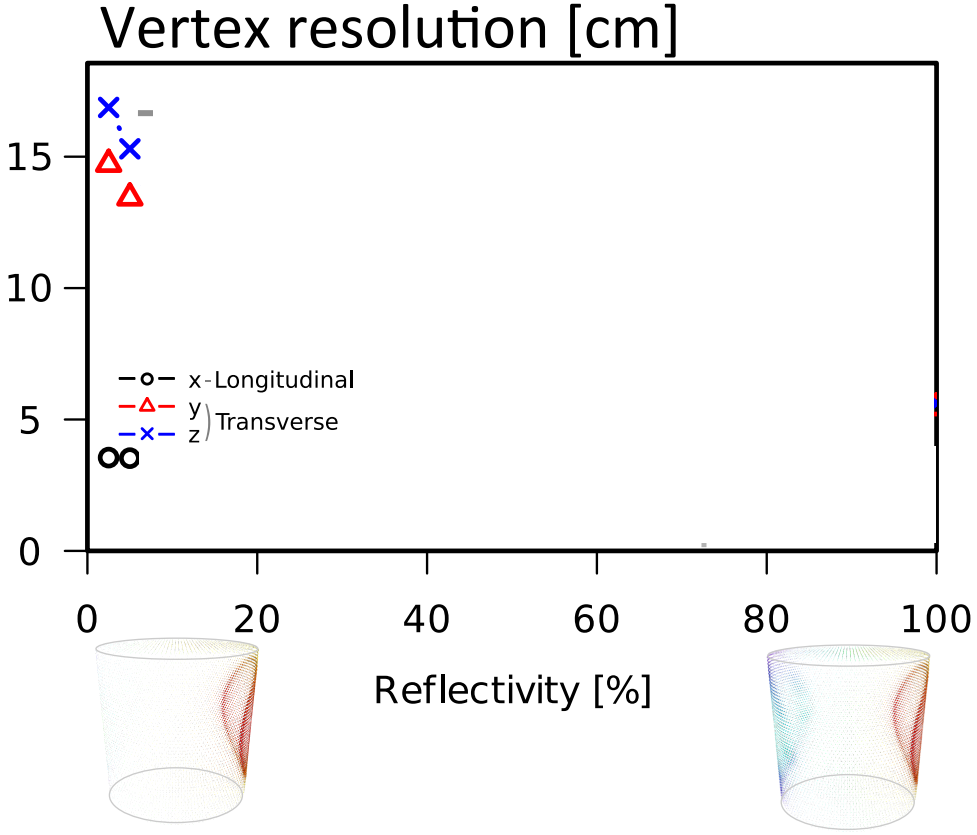
“No reflectors”

“With retro-reflectors”

A novel water-Cherenkov detector design with **retro-reflectors** to produce **antipodal rings**







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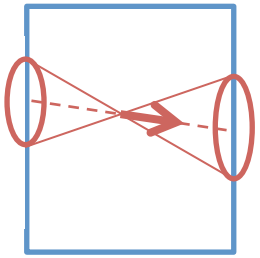

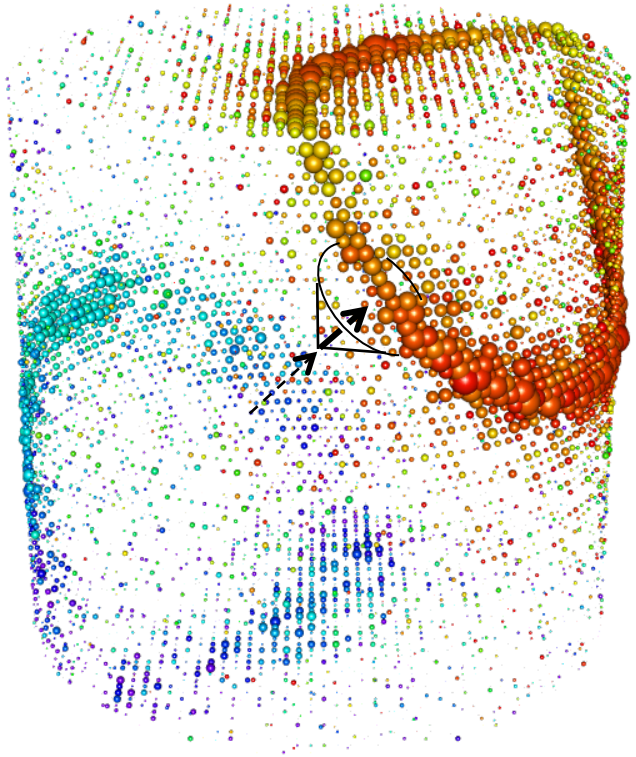

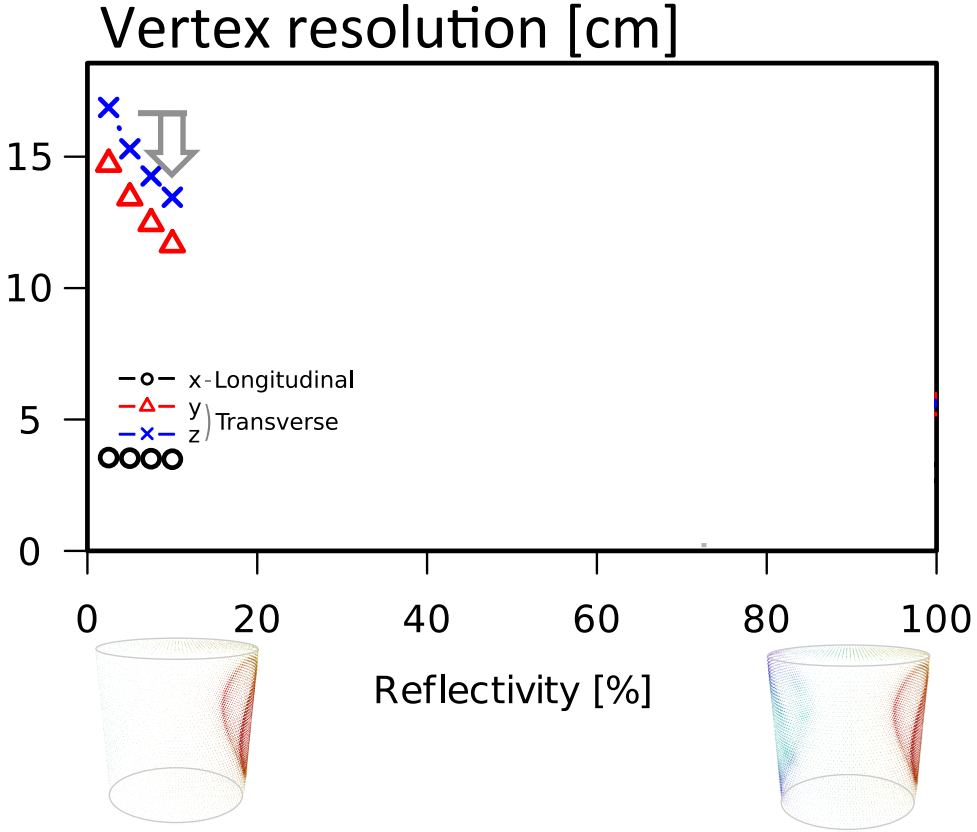

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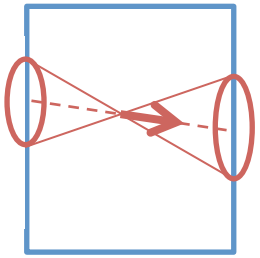

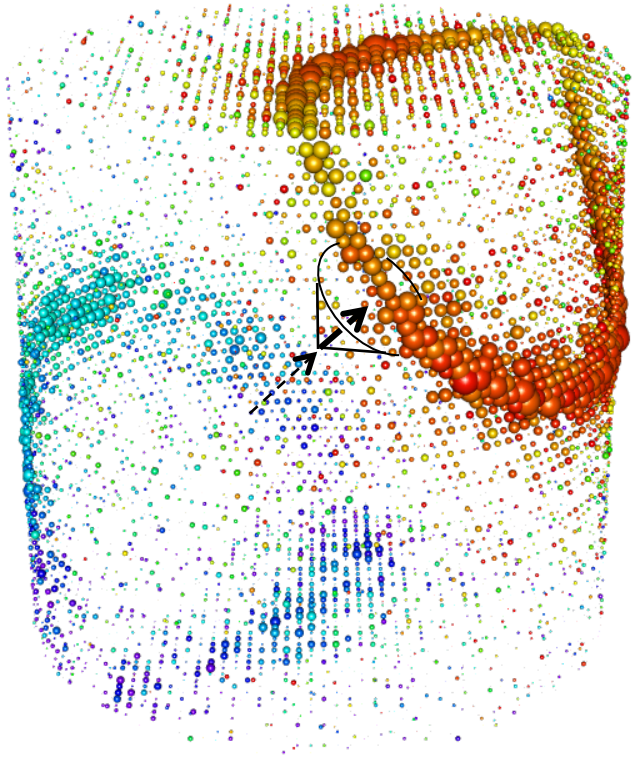

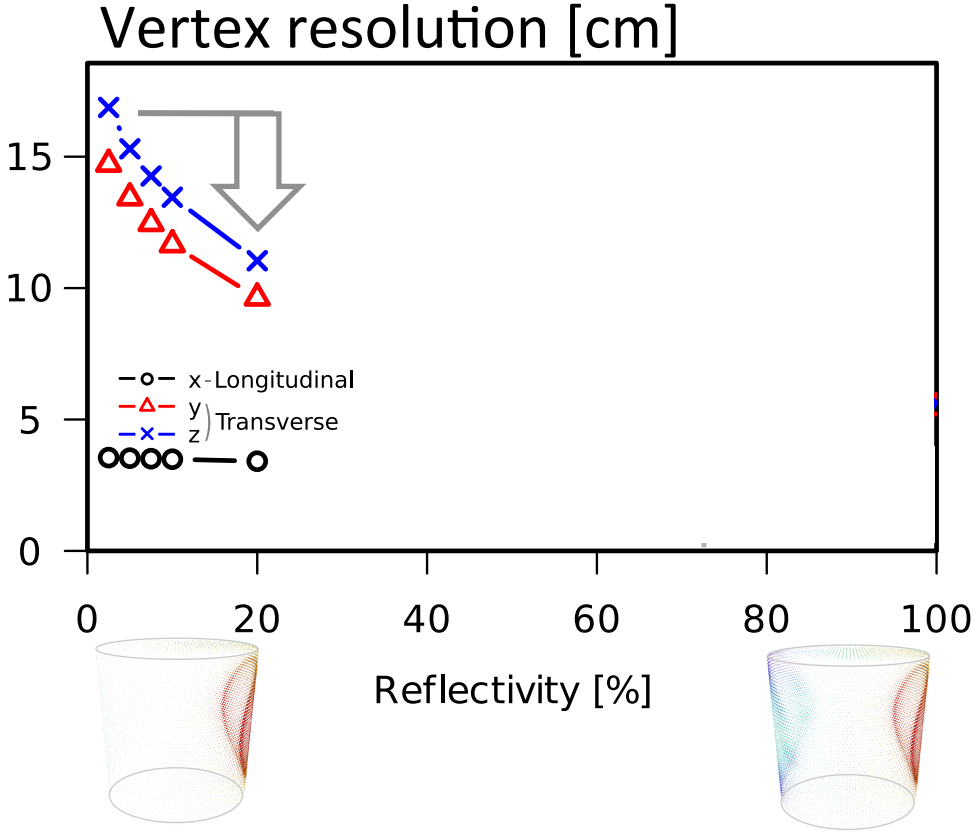

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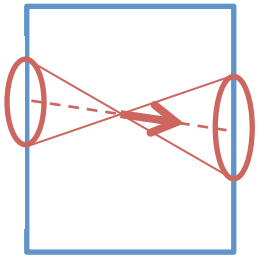

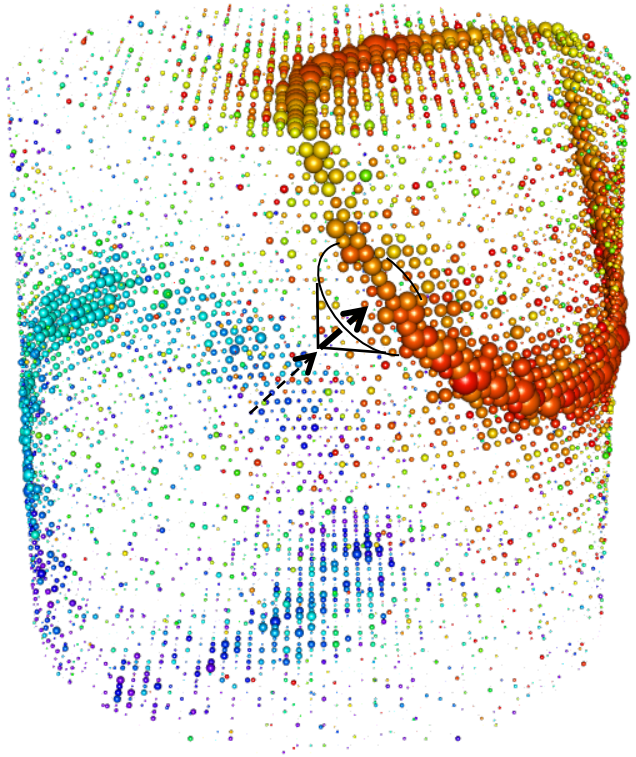

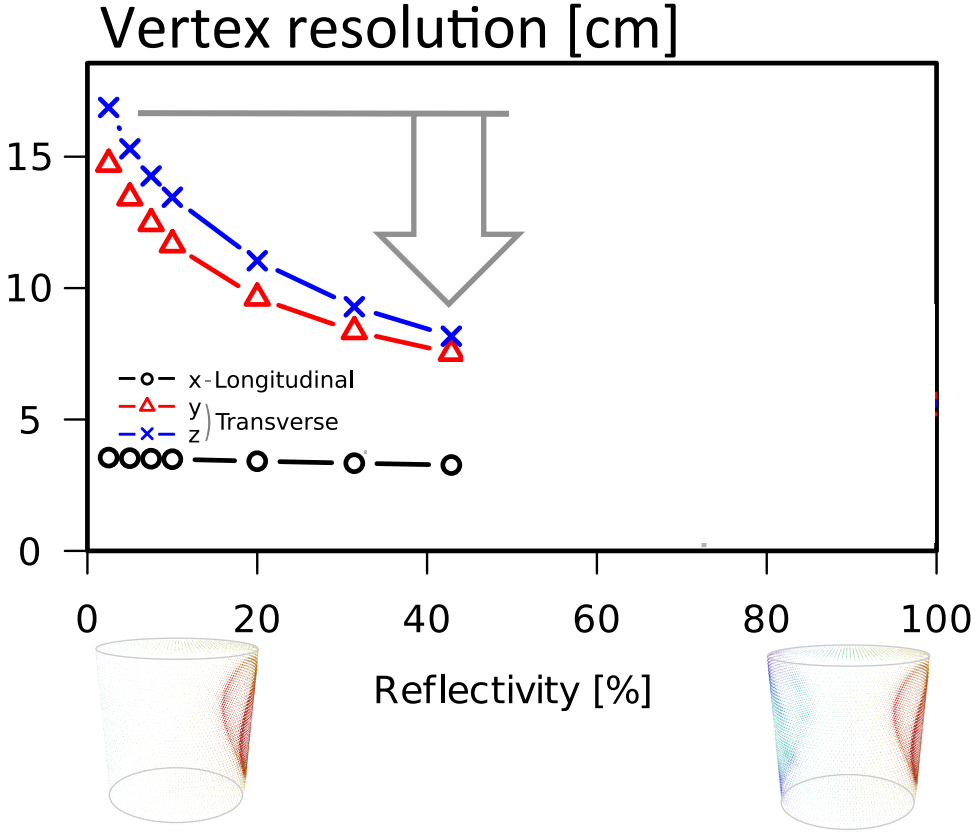

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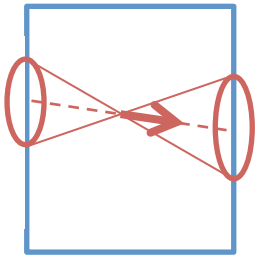

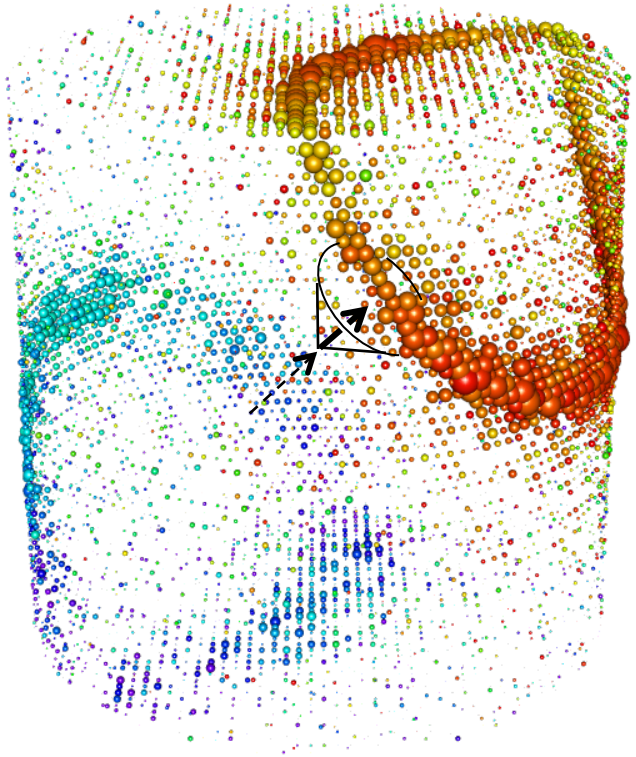

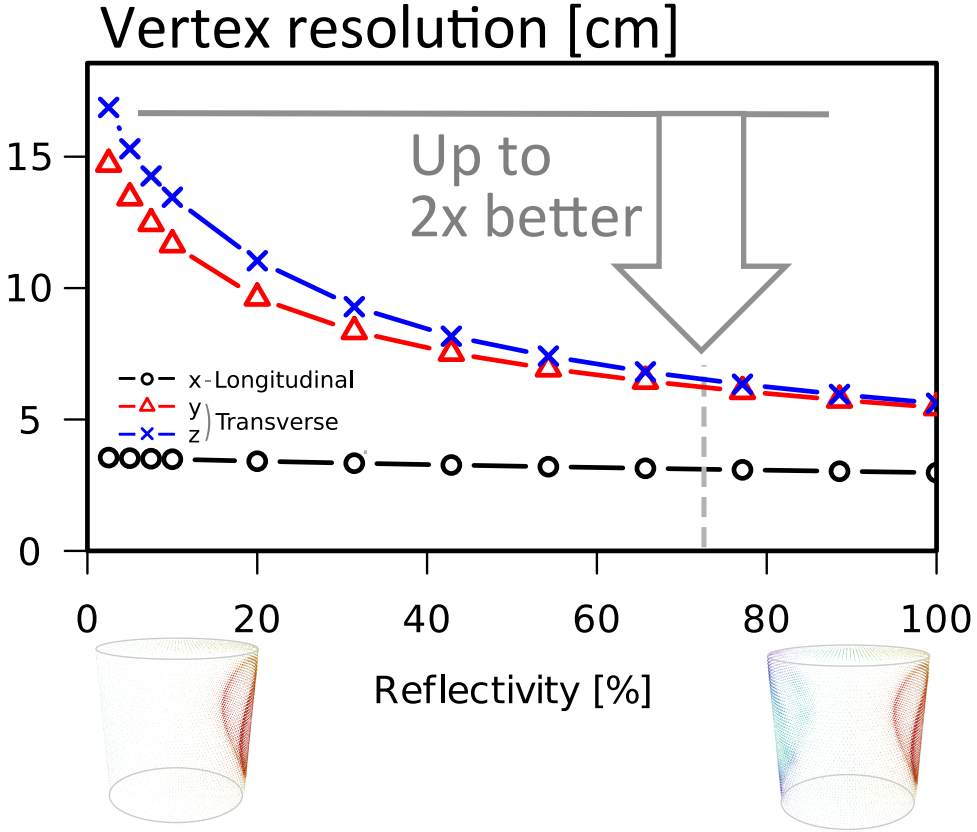

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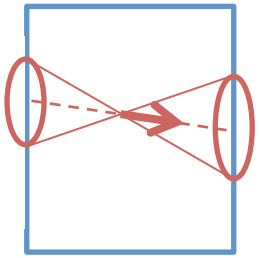

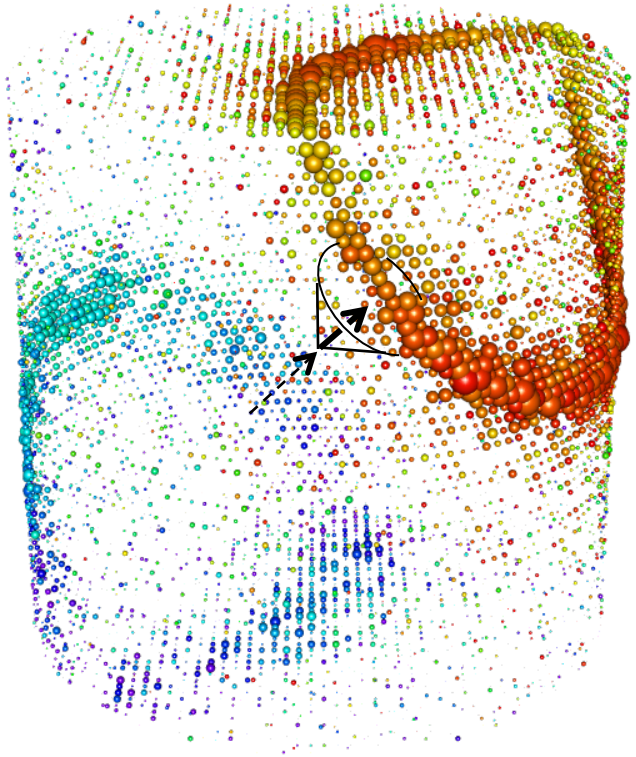

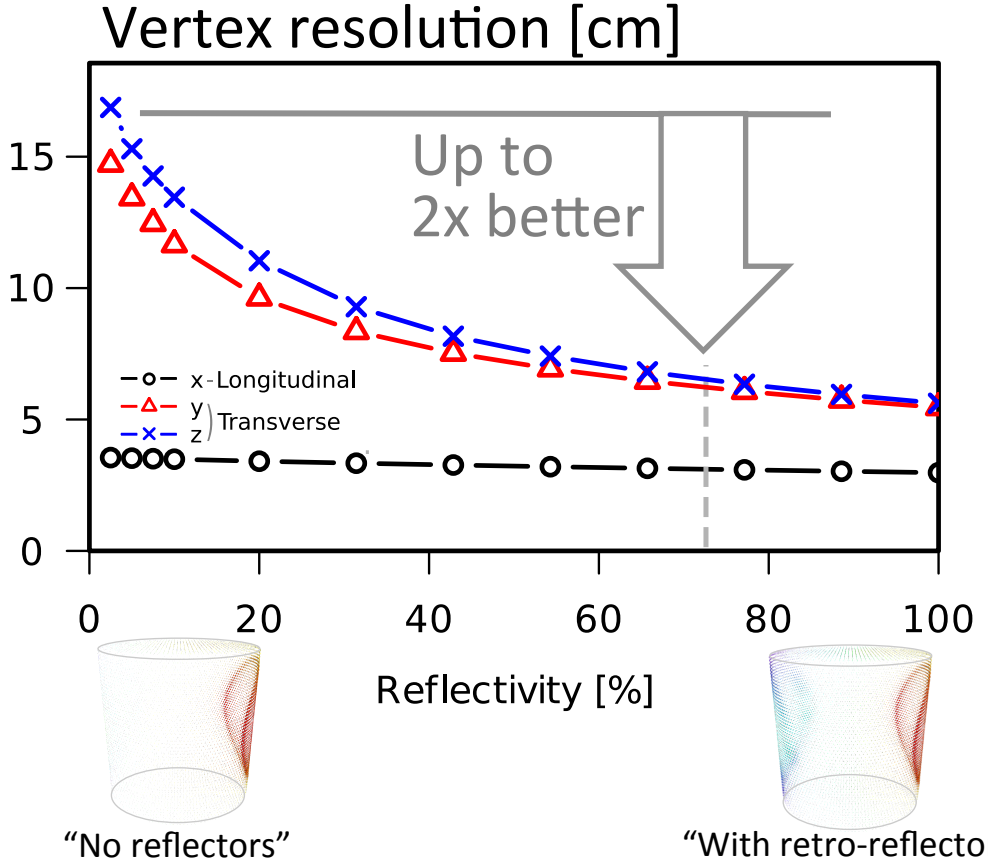

✓ Better ring reconstruction → physics

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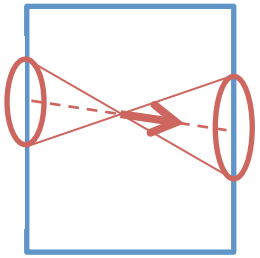
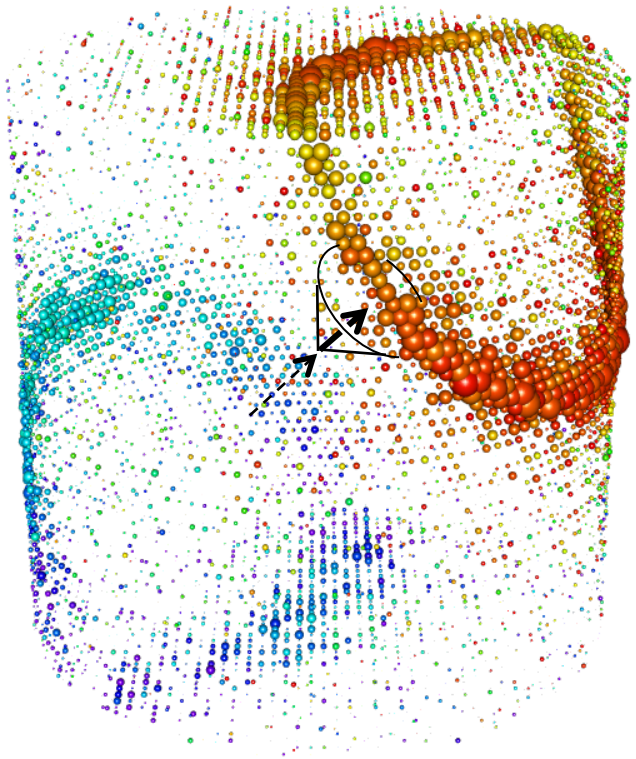
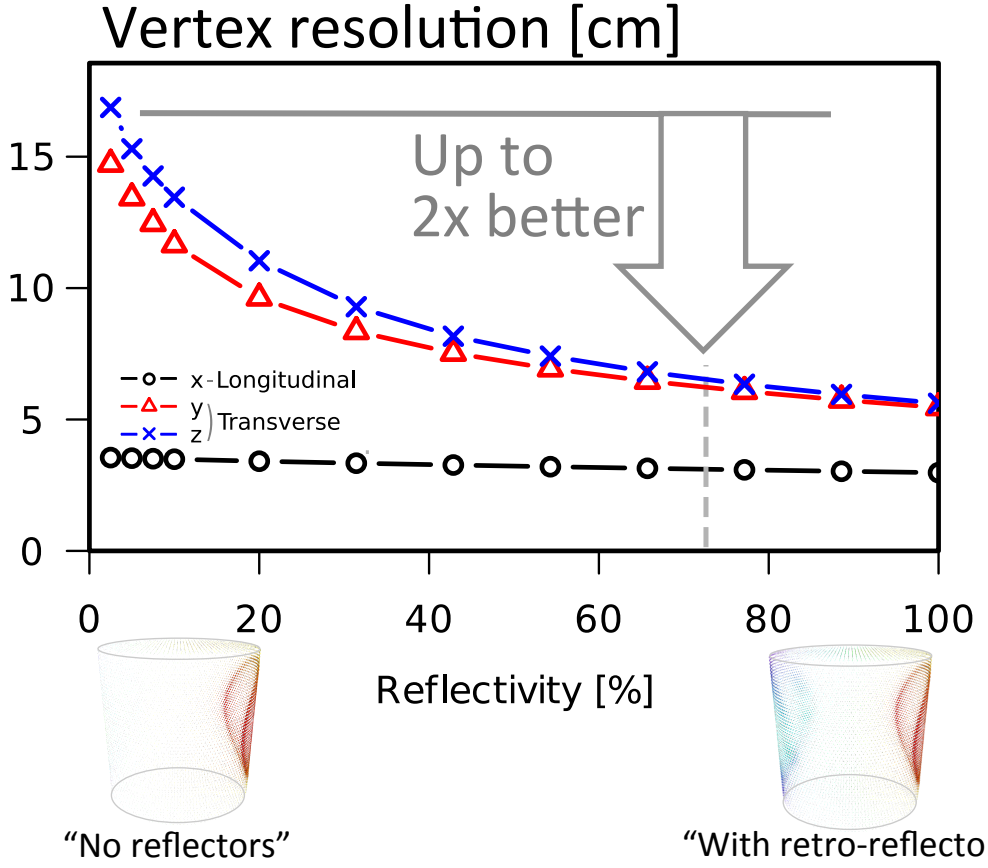
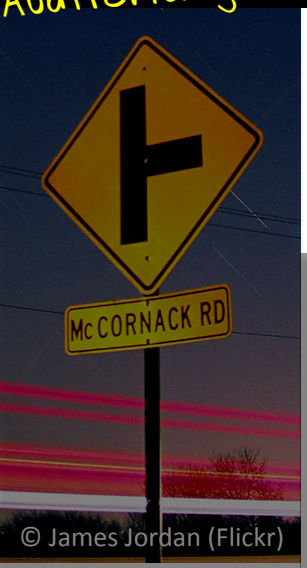






✓ Better ring reconstruction → physics

✓ Can reduce number of PMTs → $$



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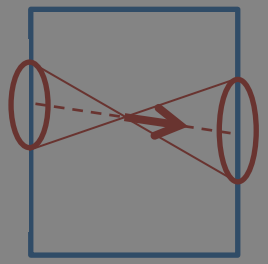

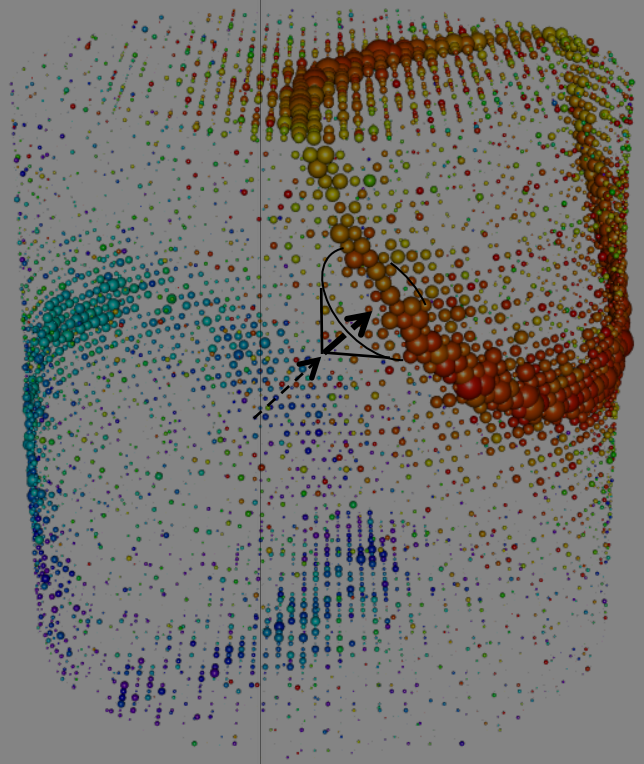

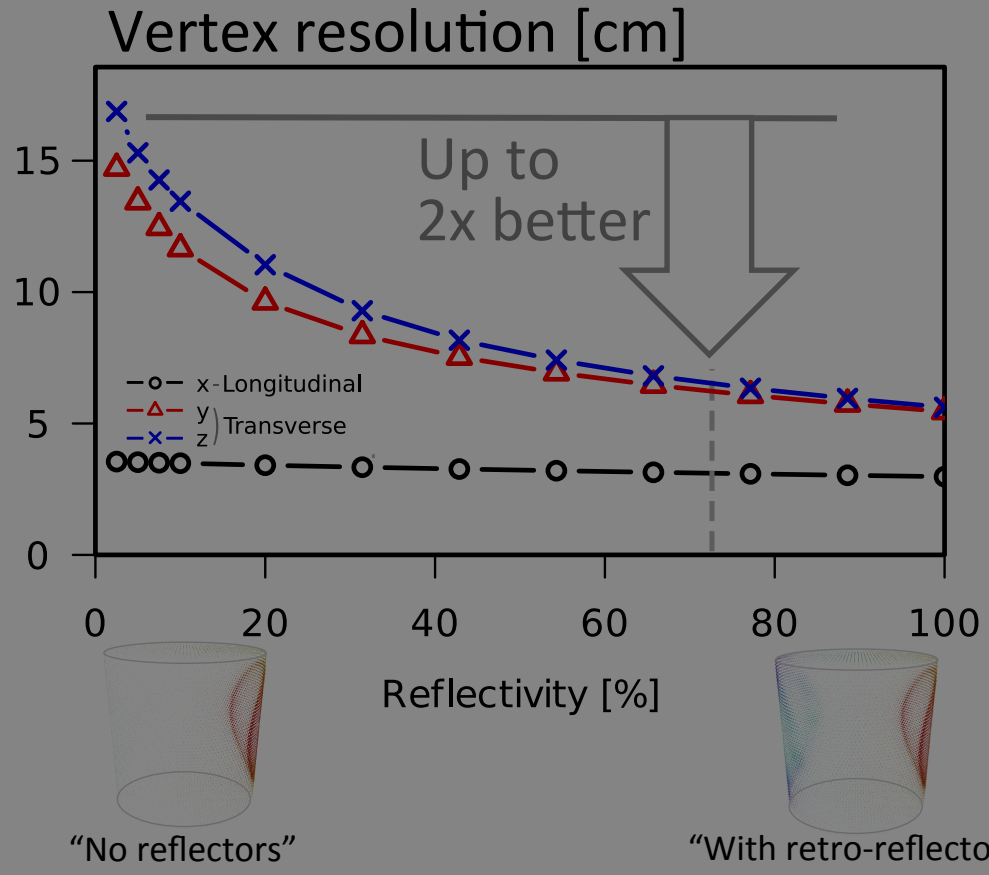

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