Proof of principle booster setup for the MADMAX dielectric haloscope

Jacob Egge, Stefan Knirck, Chris Moore, Moahan Murugappan, Béla Majorovits, Olaf Reimann

for the MADMAX collaboration

Max-Planck-Institut für Physik, München

madmax.mpp.mpg.de



14,0

14,5

15,0

The MADMAX Idea



Proof of Principle Setup







Boost Factor Repeatability Genetic



 \rightarrow measured responses compatible with desired boost factors in 1D model frequency position within $\sim 5\% \Delta f$ (FWHM) and boost amplitude within ~ 10% β^2 (amplitude)

Others: Diffraction, Tilts, Surface Parallelism, Dielectric Loss, ...

Conclusion

for up to 5 disks: system with predicted electromagnetic response can be built reflections included in 1D model accuracy within goal margins Outlook: go up to 20 disks, antenna upgrade, independent optical distance measurement, tilt studies; 3D simulations & systematics studies

Further Reading

- MADMAX Working Group, Phys. Rev. Lett. **118**, 091801 (2017) [arXiv:1611.05865]
- A. Millar et al., JCAP 1701(01), 061 (2017) [arXiv:1612.07057]
- MADMAX Collaboration, Eur. Phys. J. C (2019) 79: 186 [arXiv:1901.07401]

