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Simulation of imaging air shower Cherenkov telescopes as part of the TAIGA Project

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The Tunka Advanced International Gamma-ray and Cosmic ray Astrophysics (TAIGA) project aims at observation of cosmic rays and gamma rays at and beyond 100 TeV via observation of the extensive air showers (EAS) caused in the atmosphere. The low fluxes in this energy regime make huge effective areas necessary for sensitive measurements.
It is possible to instrument very large detector areas with a wide field of view using the non-imaging shower front sampling technique. Such detector arrays provide a good event reconstruction quality. However, comparing to other methods the separation between the nature of the shower's possible primaries is only poor.
In matters of gamma hadron separation and reconstruction, imaging air Cherenkov telescopes (IACT) are the better instrument, but since a stereoscopic view of a shower is needed for high reconstruction accuracy, it is difficult to achieve the large effective areas needed for ultra high energy observations.
To optimize the sensitivity, one can combine the two approaches, using both technique's strengths.
The TAIGA project will combine the existing HiSCORE timing array with small HEGRA-like imaging telescopes. In this work we present the simulations about the properties of our IACT design and the first steps towards hybrid reconstruction. These simulations are used to explore and optimize this technique and its sensitivity.

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