

## Simulating the Optical Performance of an Image Atmospheric Cherenkov Telescope

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**Abstract.** The optical system of image atmospheric Cherenkov telescopes (IACT) is one of the significant elements the parameters of which define the telescope performance, as energy threshold, angular resolution, effective area, and field-of-view (FoV). The ray-tracing technique is widely used to simulate IACT not only in the design study phase of optical systems but also in Monte Carlo simulations of air-shower events. To simulate IACT optical system and light concentrators, a non-sequential ray-tracing technique is employed. This technique can easily simulate multiple reflections on segmented mirrors or in a light concentrator without requiring the surface order in advance. To achieve this purpose, open source software RRoot-BASed Simulator for ray Tracing (ROBAST) is used. The non-sequential ray-tracing functionality of ROBAST has been realized by implementing some basic classes derived from those of ROOT. The spot diagrams of photon intensity on focal plane and collection efficiencies of light concentrator for SHALON IACT with  $8 \times 8$  degree field-of-view and 9.5 sq. m. reflector area are shown. Also 3D geometry of telescope simulated with ROBAST and ray-tracking are illustrated.