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Title:Characterization of imperfections in a Martin-Puplett interferometer using ray-tracing

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Abstract:The effects of imperfections of quasioptical components due to misalignment and manufacturing accuracy on optical path lengths in a Martin-Puplett interferometer have been studied with ray-tracing simulations. Optical path lengths in a test interferometer have been measured and then reproduced as accurately as possible in a simulation by introducing several parameters describing the imperfections. The measurements of a polarizer frame, the profile of a roof mirror and the effect of mirror tilting provide support for the existence of the simulated imperfections. The method has been applied also to the diplexer of the heterodyne array receiver CHAMP[⁺], operated by the Max Planck Institute for Radio Astronomy at the APEX telescope, to gain insights on how to improve the performance of the receiver. © Springer Science+Business Media, LLC 2012.

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