
Measurement of the turbulence profile at 40-km by the HiCIBaS II balloon mission

Denis Brousseau^{*1}, Ophélie Légaré¹, Koichi Watanabe-Brouillette¹, Philippe Truchon¹,
Émile Tremblay-Antoine¹, Anne-Sophie Poulin-Girard¹, and Simon Thibault¹

¹Laval University – Canada

Abstract

With the arrival of the next generation of extremely large telescopes, increasingly complex and demanding adaptive optics systems are needed. This is to compensate for image distortion caused by atmospheric turbulence and fully take benefit of mirrors having diameters of 30 to 40 m. This requires a more precise characterization of atmospheric turbulence. Also, as few data exist for turbulence contribution of the stratospheric phase structure function and, since it has been shown that stratospheric turbulence does not significantly degrades short-exposure images of stars but does degrade long-exposure ones, gathering statistics about the stratosphere dynamics is certainly valuable. Building on gained experience and knowledge of the HiCIBaS (High-Contrast Imaging Balloon System) mission, a balloon borne telescope to demonstrate the usability of high contrast imaging equipment on board of a stratospheric balloon flight, HiCIBaS II proposes, as one of its several scientific goals, to use a wavefront sensor at 36-40 km to measure and gather data of the atmospheric dynamics of the atmosphere at those altitudes. The acquired data can help to validate existing models for the power spectrum of the refractive-index fluctuations in the stratosphere.

Keywords: wavefront sensing, atmospheric turbulence

^{*}Speaker