

Apodized Lyot coronagraph for SPHERE/VLT: II. Laboratory tests and performance

Géraldine Guerri · Jean-Baptiste Daban · Sylvie Robbe-Dubois · Richard Douet · Lyu Abe · Jacques Baudrand · Marcel Carbillet · Anthony Boccaletti · Philippe Bendjoya · Carole Gouvret · Farrokh Vakili

Received: 5 October 2010 / Accepted: 4 March 2011 / Published online: 24 March 2011
© Springer Science+Business Media B.V. 2011

Abstract SPHERE (which stands for Spectro-Polarimetric High-contrast Exoplanet REsearch) is a second-generation Very Large Telescope (VLT) instrument dedicated to high-contrast direct imaging of exoplanets whose first-light is scheduled for 2011. Within this complex instrument one of the central components is the apodized Lyot coronagraph (ALC). The principal aim of this paper is to report the first laboratory experiment of the ALC designed for the SPHERE instrument. The performance and sensitivity of the optical configuration was first numerically studied with an end-to-end approach (see the results in paper I subtitled “Detailed numerical study”). Made confident by the results, we then tested a prototype on an infrared coronagraphic bench. We measured the transmission profiles of the apodizer prototype and the coronagraphic performance of the apodized Lyot coronagraph in Y, J, and H bands. The coronagraph sensitivity to lateral and longitudinal misalignments of its three main components (apodizer, coronagraphic mask and Lyot stop) was finally studied in H band. We can conclude that the prototype meets the SPHERE technical requirements for coronagraphy.

G. Guerri (✉) · J.-B. Daban · S. Robbe-Dubois · R. Douet · L. Abe · M. Carbillet · P. Bendjoya · C. Gouvret · F. Vakili
UMR 6525 H. Fizeau, Université Nice Sophia Antipolis/CNRS/Observatoire de la Côte d’Azur, Parc Valrose, 06108 Nice cedex 2, France
e-mail: geraldine.guerri@ulg.ac.be

J. Baudrand · A. Boccaletti
UMR 8109 LESIA, Observatoire de Meudon/CNRS, 5 Place J. Janssen,
92195 Meudon, France

Present Address:

G. Guerri
Département d’Astrophysique, Géophysique et Océanographie, Centre Spatial de Liège,
Avenue Pré-Aily, 4031 Angleur, Belgique