

EUROPEAN SPACE AGENCY

ASTRONOMY WORKING GROUP

Recommendation on the GENIE instrument
and on Polarization Measurements at the VLTI

At its 123rd meeting held on 22-23 September 2005 at ESA Headquarters, Paris, the Astronomy Working Group (AWG) was briefed by the ESA Study Scientist on the status of GENIE and on the report prepared by the GENIE-SAT (SCI-SA GENIE 2005:2), circulated to the AWG members in advance of the meeting. This report includes a summary of the results from two parallel industrial phase A studies of the instrument.

The AWG endorses the recommendation of the GENIE-SAT to conduct measurements at the European Southern Observatory's Very Large Telescope Interferometer (VLTI) in order to characterize the differential polarization between two arms of the interferometer. Such measurements are a prerequisite for assessing the feasibility of GENIE. Furthermore, the polarization measurements will directly contribute to the technical development of DARWIN by establishing sensitive measurement and calibration procedures for polarization effects in infrared interferometers. The success of the DARWIN mission will depend critically on tight control of all polarization effects and the proposed measurements at the VLTI will provide an important step towards understanding the relevant issues.

Therefore, the AWG recommends that measurements be conducted at the VLTI to characterize the differential polarization between two interferometer arms at infrared wavelengths.

The industrial studies have demonstrated that GENIE will be feasible provided that polarization effects can be controlled to a sufficient level. It has become apparent, however, that the implementation of GENIE at the VLTI will face certain difficulties related to the limitations of the existing facility, which had not been designed for the very stringent requirements of nulling interferometry. Before any recommendation can be made on the future development of GENIE, alternative ways should be investigated in which the technical and astronomical goals of GENIE might be achievable. These goals include the demonstration of nulling interferometry in a complete instrument and the measurement of the level of exo-zodiacal light around DARWIN target stars.

The AWG recommends that alternative ways to achieve the technical and astronomical goals of GENIE should be investigated, in order to optimize the technical and scientific preparation of DARWIN before any decision is made on the possible implementation of GENIE.