



## Asteroid Polarimetry: State of the art and a roadmap for future developments

Alberto Cellino

INAF, Osservatorio Astrofisico di Torino, Pino Torinese (TO), Italy (cellino@oato.inaf.it)

The state of partial linear polarization of the sunlight scattered by asteroid surfaces in different illumination conditions is diagnostic of a number of important physical properties of the objects. Historically, the most important applications of polarimetry to asteroid studies have been focused on the derivation of the geometric albedo and of the typical sizes of the particles forming the regolith layer covering the surface. This means that, making use of large telescopes, polarimetry can be of crucial importance to achieve a reasonable physical characterization of interesting objects, including members of dynamical families as well as near-Earth objects, particularly those which are potentially hazardous for the terrestrial biosphere. In addition, in more recent years it has been realized also that polarimetric properties are useful to identify objects belonging to different taxonomic classes, including some which may be extremely primitive. In this respect, the discovery of unexpected classes of objects exhibiting peculiar polarization properties (in particular, the so-called Barbarians) has been very important. There are therefore good reasons to expect that asteroid polarimetry will be very important in the years to come. In addition to existing observing facilities, new ones are going to begin operations in the near future.

Some much needed developments of future investigations include a better calibration of the relation between polarimetric properties and albedo, a better understanding of the physics of light scattering phenomena, and some applications to hot topics in asteroid science, including asteroid families, the effects of space weathering, asteroid-comet relations, and techniques of alarm and mitigation of the danger posed by potential Earth impactors.