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Towards a new Calibration of the Polarization-Albedo Relation for the Asteroids.

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Polarimetry is a very useful tool to derive information about some physical parameters of atmosphereless Solar System bodies which are difficult to obtain by means of other techniques of remote observation. Among these parameters there is certainly the geometric albedo, which quantifies the fraction of sunlight incident on the surface which is scattered back and not absorbed. The geometric albedo is a fundamental parameter, since it is strictly related to the general composition of the surface, as well as to properties of the material at different scales, which determine the efficiency of light scattering. In the case of asteroids, the albedo is needed also to derive the size of the objects when their absolute magnitude is known, and is also strictly related to the spectroscopic properties which determine the taxonomic classification of the objects. The determination of asteroid albedos, however, is a challenging task. One of the best techniques for albedo determination is polarimetry, which exploits some known relation between the albedo and some properties of the observed variation of the degree of linear polarization for different observing circumstances (described by the so-called phase angle). For a long time the most important problem in asteroid polarimetry has been to find a good calibration of the above relation. We present here the results of a dedicated observing campaign aimed at obtaining polarimetric data for a sample of objects for which the albedo is supposed to be known with high accuracy. Our results consist of a new calibration of the relation between the so-called polarimetric slope and the albedo. This new calibration constitutes the current state of the art in the field of asteroid polarimetry.