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GAIA mission: the true time saver for asteroids shape modeling and spectral classification

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Our work aims to determine the shape models of a few asteroids, derived by using a combination of our dense photometric data with the sparse data provided by the database AstDys and as well as by the GAIA mission. These sparse data help us in gaining additional information for the asteroids with a small number of lightcurves and are in favor of the required observational time. Unlike the low-accuracy sparse photometric data from ground-based telescopes, GAIA provides us with sparse data with much higher accuracy. Using GAIA DR3, we managed to give complex solutions for the asteroid's physical model, including its shapes, sense of rotation, and spectral class. The dense data in our work was collected from long-term observations done at NAO Rozhen, Bulgaria.

Additionally, the GAIA mean, sigma-clipped 16-bands spectra of our targets are compared to the mean reflectance spectra of all asteroids' spectral classes from the Bus-DeMeo taxonomy. We assigned the most plausible taxonomy for the asteroids that were unclassified before. The objects with a pre-obtained taxonomy, from our observations, were compared with the GAIA-determined spectral class. GAIA and upcoming surveys will be used in our future work in addition to our dense photometric and spectroscopic observations for enriching the number of asteroids with known physical parameters.

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