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In some of the images taken by OSIRIS, pieces of debris can be seen as bright tracks instead of points sources as result of the combination of movements of both particles and spacecraft. The properties of those tracks, such as orientation, length and total brightness, depend on various comets parameters, including the activity on the nucleus surface, capable of lifting and accelerating the particles, and the characteristics of dust grains, as grain sizes, spatial distribution, velocity, density and sensitivity to radiation pressure. Previous works have focused on retrieving some of these grain properties from the mentioned images, but since the images show the 2D projection of the 3D dust motion, they rely on different methods to obtain the distance between the camera and the debris.

In this work, a new method to bypass this distance determination requirement is proposed. The main steps involved are (i) analyze a large set of images containing tracks generated by moving dust grains, and obtain distribution for selected track parameters (orientation, length, total brightness, etc.) using an algorithm based on the Hough transform method; (ii) compare these results with the ones obtained from artificial images, generated by modeling the three dimensional motion of the debris in the gas flow field of the comet, under the influence of gravity, radiation pressure and gaseous drag; (iii) iterate this process in order to refine the parameters characterizing the physical properties of the dust emission used by the model.