

Ensemble properties of Jupiter family comets from ground photometric observations

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We provide an updated study of the collective properties of JFCs by increasing the sample of comets with well-studied rotation periods and surface characteristics. To collect the sample, we reviewed the properties of 35 JFCs with published rotation properties and added new lightcurves and phase functions for nine JFCs observed between 2004 and 2015.

The new extended sample confirms the known cut-off in bulk density at $\sim 0.6 \text{ g cm}^{-3}$ if JFCs are strengthless. Assuming the model of Davidsson (2001) for prolate ellipsoids with typical density and elongations, we determined that JFCs require tensile strength of 10-25 Pa to remain stable against rotational instabilities. To provide further constraints on the physical characteristics of JFCs we combine these findings with a study of the activity-induced spin changes of JFCs. Using the newly derived albedos and phase functions, we found that the median linear phase function coefficient for JFCs is 0.046 mag/deg and the median albedo is 4.2 per cent. We found evidence for an increasing linear phase function coefficient with increasing albedo.
