with the parent body of a meteor shower is part of this confidence index. In fine, a single code will be provided for each prediction of meteor showers at any planet with a focus on Earth, Mars and Venus.

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219 – Comet Physical Characteristics: Surfaces Posters

219.01 – Force Survey and Statics of Structures on a Two-Lobed Comet

In recent years, Scheeres and coworkers have shown the value of surveying the forces at work on the surface of small asteroids. From this analysis, it has been shown that cohesion dominates the behavior of surficial regolith on small bodies and may enable the existence of fast-rotating asteroids. The recent Rosetta mission to comet 67P/Churyumov-Gerasimenko (67P) observed surface structures, specifically clumps and spires, indicating that cohesion is also likely to drive regolith behavior on this body. We will present a survey of forces present at the surface of a simplified two-lobed comet (elliptical lobes with size and rotation state inspired by 67P), considering shape-dependent gravity, rotation, cohesion, and gas drag. We will also present the statics of a sample spire, indicating the level of cohesion required to stabilize this type of formation. This analysis will provide a preliminary indication of the significance of forces present on the surface of a 67P-like comet.

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219.02 – Mapping of thermal properties of comet 67P/C-G and temporal variations

The long-term evolution of the surfaces of comets depends mainly on the erosion rate that is driven by the thermal properties of the regolith and the sub-surface material. Following the diurnal and the seasonal thermal cycles, dust and gas are released progressively, increasing the erosion process. The amount of dust released depends on the surface and subsurface temperatures and thus on thermal inertia and bulk composition.
The ESA's Rosetta spacecraft has followed the comet 67P/Churyumov-Gerasimenko over several months from 4 AU to 1.28 AU heliocentric distance, and the VIRTIS/Rosetta imaging infrared spectrometer was capable of detecting the thermal emission of the surface longward of 3 microns.
The surface temperature was mapped over a large fraction of the nucleus and was previously used to derive thermal inertia of the main geomorphological units.
In this presentation, we now focus on two different aspects: (1) We aim to present a complete detailed map of the thermal inertia by combining measurements of similar areas obtained at different viewing angles ; and (2) we track the evolution of the local thermal properties derived over months when the comet was moving towards perihelion. We then discuss and compare our results with the textural features observed at the surface.

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219.04 – Rotation Rates and Spin Changes of Jupiter Family Comet Nuclei: New optical lightcurves and an update on the population properties.

In this work, we revise the physical characteristics of Jupiter family comets (JFCs) by expanding the sample of nuclei with known rotational and shape properties.
The study provides a review of the properties of all JFCs with known rotation rates derived from optical, radar or spacecraft measurements. This sample is complemented by newly obtained lightcurves of eight comets which are used to improve the precision of some known spin rates as well as to add new objects to the sample. We derive the new lightcurves from archival data partially taken within the framework of the Survey of Ensemble Physical Properties of Cometary Nuclei (SEPPCoN) and from devoted phase function observing campaigns. The lightcurves are produced with a specially-developed pipeline which enables data from various instruments at different epochs and geometries to be analyzed together. All lightcurves are absolutely calibrated using PanSTARRs photometric standards. Combining photometric measurements from different epochs allows us to achieve high precision in the period determinations and to constrain the phase functions of the comets. For three of the comets - 8P/Tuttle, 110P/Hartley 3 and 162P/Siding Spring - we obtain well-sampled phase functions which we compare to these of other well-studied JFCs.
The newly added data provide us with a better-constrained sample which we use to compare JFC characteristics with the rotation rates, shapes and surface properties of other small-body populations.
A special focus is put on the handful of JFCs which are known to demonstrate spin changes on orbital timescales. We are expanding this sample by adding new lightcurves derived from archival data as well as from our targeted survey using 2-4m telescopes. The rotational changes are obtained by comparison of the comets' current spin rates to those from previous apparitions. Using the new extended sample, we study the relation between the measured period changes and the physical properties of the nuclei.

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219.05 – High-resolution Goldstone radar imaging of comet P/2016 BA14 (Pan-STARRS)

Comet P/2016 BA14 (Pan-STARRS) was discovered by Pan-STARRS on January 21, 2016 and approached Earth within 0.024 astronomical units (9.2 lunar distances) on March 22. It was originally classified as an asteroid but subsequent observations (Knight et al., CBET 4257, 2016) showed the presence of a faint, short tail suggesting that the object is a comet. The similarity of its orbit to that of comet 252P/LINEAR led to speculation of a common origin.
We observed 2016 BA14 with radar using the 70-m DSS-14 (8560 MHz, 3.5 cm) and 34-m DSS-13 (7190 MHz, 4.2 cm) antennas at Goldstone as transmitters and the 100-m Green Bank Telescope in West Virginia as a receiver on four days spanning one week around close approach. The best images have range resolutions of 7.5 m/pixel and are the finest resolution comet images ever obtained at Goldstone. The maximum visible extent of the nucleus in the radar images is about 900 m, strongly implying that the diameter is more than 1 km. Its absolute magnitude of 19.5 and a diameter of at least 1 km imply an optical albedo of < 3%. The echo bandwidth is ~2.5 Hz, which suggests a slow rotation period of about 40 h that is consistent with the rotation evident in images obtained on each day. There are no obvious signatures of a coma in the radar data. The appearance of the leading edge of the nucleus varies significantly as