Thermophysical Model of 433 Eros

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We use high-fidelity asteroid shape models to reproduce near-IR spectra, which were obtained over multiple viewing geometries and rotational phases, in order to understand the global and local properties of NEA surfaces in more detail than is possible with approaches that assume a simple geometric shape. Combining thermal emission, reflectance, shape, and bulk topography information in a single thermophysical model allows for the thermal and scattering properties of different regions on the surface to be investigated, thus enabling a better understanding of both the heterogeneity of an NEA's surface in addition to its global average properties. We present results from our investigation of (433) Eros, a particularly interesting object given the availability of detailed information from the NEAR Shoemaker spacecraft mission. We obtained thermal near-IR spectra of Eros using the NASA/IRTF SpeX instrument over 8 observing epochs during Eros's apparitions in 2009, 2011, and 2018. These data probed a variety of sub-Earth latitudes, including views of major surface features Charles Regio, Psyche Crater, Himeros Crater, Finsen Dorsum, Hinks Dorsum, and the south rotation pole, from several different orientations. The shape, topographic, and albedo properties revealed by NEAR allow us to connect our spectra to thermal properties of specific regions of Eros's surface, as well as to constrain the globalaverage thermal properties. We will show results from our thermophysical modeling of Eros using our code SHERMAN (Magri et al. 2018, Icarus 303, 203-219) and will discuss how Eros's thermal emission varies over the surface and what that implies for the heterogeneity of Eros's surface properties.