RESULTS FROM SEPPCoN, A SURVEY OF ENSEMBLE PHYSICAL PROPERTIES OF COMETARY NUCLEI. Y. R. Fernández[1], M. S. Kelley[1], P. L. Lamy[2], I. Toth[3], O. Groussin[2], M. F. A'Hearn[4], J. M. Bauer[5], H. Campins[1], A. Fitzsimmons[6], J. Licandro[7], C. M. Lisse[8], S. C. Lowry[5], K. J. Meech[9], J. Pittichová[9], W. T. Reach[10], C. Snodgrass[11], and H. A. Weaver[8]. [1]Dept. of Physics, Univ. of Central Florida, 4000 Central Florida Blvd., Orlando, FL, 32816 (yan@physics.ucf.edu), [2]Laboratoire d'Astrophysique de Marseille, BP 8, 13376 Marseille Cedex 12, France, [3]Konkoly Obs., P.O. Box 67, H-1525, Hungary, [4]Dept. of Astronomy, Univ. of Maryland, College Park, MD, 20742, [5]NASA/JPL, 4800 Oak Grove Dr., Pasadena, CA, 91109, [6]Astrophysics Research Centre, Queen's Univ. Belfast, Belfast, BT7 1NN, UK, [7]Instituto de Astrofísica de Canarias, Apto. 303, E38700 Santa Cruz de La Palma, Spain, [8]Johns Hopkins Univ. Applied Physics Lab., 11100 Johns Hopkins Rd, Laurel, MD, 20723, [9]Inst. for Astronomy, Univ. of Hawaii, 2680 Woodlawn Dr., Honolulu, HI 96822, [10]IPAC, MS 220-6, Caltech, Pasadena, CA, 91125, [11]ESO, Alonso de Córdova 3107, Vitacura, Santiago, Chile.

Introduction: We present results from SEPPCoN, a Survey of Ensemble Physical Properties of Cometary Nuclei. This ongoing project surveys 100 Jupiter-family comets (JFCs) to measure the thermal emission and reflected sunlight of the nuclei. The scientific goal is to determine the distributions of radius, geometric albedo, thermal inertia, axial ratio, and color among the JFC nuclei. We use the Spitzer Space Telescope for mid-infrared measurements and many ground-based telescopes (atop Mauna Kea, Cerro Pachón, La Silla, La Palma, Apache Point, Table Mtn., and Palomar Mtn.) for visible-wavelength measurements. Our sample represents about 30% of all known JFCs. In this presentation we discuss mainly the Spitzer observations, which are complete. Each comet was imaged at either two wavelengths (16 and 22 μm) with IRS's peak-up camera or at one wavelength twice (24 μm) with MIPS. In all but a few cases each comet was observed while at heliocentric distance $r > 4$ AU, and many comets were observed at $r > 5$ AU. This minimized the effects of activity and dust and in general gave us unambiguous views of the nuclei.

Data Analysis: Over half of our comets did indeed show bare nuclei, but about one-third showed the point-source nucleus embedded in either a coma, trail, or trail [1]. However, image processing techniques (see [2]) allowed in most cases a robust photometric extraction of the nucleus's flux. Currently we have final, confident photometry of 75 of the nuclei in our sample.

Thermal Inertia: We can estimate the thermal inertia of those nuclei observed with IRS. Using the Near-Earth Asteroid Thermal Model [3], we find that the JFC ensemble-average beaming parameter is 1.1. This is suggestive of a low thermal inertia, and we will present further analysis using other thermal models that constrain the value of the thermal inertia Γ itself. We will also compare Γ to its value in other nuclei (e.g. [4]).

Size Distribution: The thermal model also yields an effective radius for each of the 75 nuclei with finished photometry. Since the nuclei likely have low geometric albedos, a radius is almost completely determined by the mid-infrared brightness. We have constructed a cumulative size distribution (CSD) from these radii, and this CSD is independent of other CSDs published earlier (e.g. [2,5,6,7]) that mostly used visible-wavelength magnitudes. With visible data, one must assume an albedo to convert the magnitude to a radius, whereas we only need to assume that the albedo was less than about 0.1, and we did not need to assume constant albedo. Interestingly, we find a power-law slope to our CSD that is similar to those derived from magnitude studies, indicating perhaps that there is no strong trend of albedo with radius among the JFC nuclei. Our measured CSD turns over at smaller radii, at least partially due to the incompleteness of the sample at sub-kilometer sizes. We will also present more analysis of this small-end of the distribution, where we investigate the idea that the JFC size distribution has a small-size cutoff, as discussed by [6].

References: [1] Kelley M. S. et al. (2008), this meeting. [2] Lamy et al. (2004) in *Comets II* (M. Festou et al., eds.), U. Az. Press, Tucson, 223. [3] Harris A. W. (1998), *Icarus* 131, 291. [4] Groussin O. et al. (2007), *Icarus* 187, 16. [5] Weissman P. R. and Lowry S. C. (2003), *LPSC XXIV,* Abstract #2003. [6] Meech K. J. et al. (2004), *Icarus* 170, 463. [7] Tancredi et al. (2006), *Icarus* 182, 527.

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