Goldstone 3.5-cm planned radar observations of the Mercury South Polar Region

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We report here on a planned campaign of radar observations of Mercury in February 2001 using the 3.5-cm system on the Goldstone 70-m antenna. Mercury shows radar-bright features at the north and south poles that are most likely caused by enhanced backscatter from water ice deposits in shaded crater floors (Slade et al., 1992; Harmon and Slade, 1992; Butler et al, 1993; Harmon et al., 1994). The recently upgraded Arecibo radar was used to make high-quality images of the *NORTH* pole at 3-km and 1.5-km resolution (Harmon et al., 2000). The south pole will be observable from Goldstone in February 2001, and on a yearly basis for a few years after that. Moreover, the observing aspect next year will be optimal with the south pole tilted toward Earth by up to 10.7 deg (the best view ever possible) at minimum distance and hence maximum echo strength). The Goldstone observations will be made using the so-called "long-code" technique to mitigate the aliasing effects of the overspread echo (Harmon et al., 1999). These new Goldstone observations are almost sure to reveal additional south polar features not seen in the old lower-resolution (15-km) Arecibo image, not only because of the anticipated improvement in resolution and signal/noise, but also because we will be observing the pole from the opposite longitudes. The new Goldstone observations will provide high-quality images at 3.5-cm wavelength that can be compared directly with similar future Arecibo images at 13-cm wavelength obtained after the south pole comes back into view in 2004. Such multi-wavelength comparisons can measure the thicknesses of (thermally insulating) dust mantles (Vasavada et al.,1999). We note these images will also give full coverage of the visible Mercury disk and will therefore be useful for reflectivity mapping of non-polar regions.

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