Abstract Submitted for the APR07 Meeting of The American Physical Society

Radio Imaging of the Gravity Probe B Guide Star IM Pegasi MICHAEL BIETENHOLZ, RYAN RANSOM, NORBERT BARTEL, York University, DANIEL LEBACH, MICHAEL RATNER, IRWIN SHAPIRO, Harvard-Smithsonian CfA, JEAN-FRANCOIS LESTRADE, Observatoire de Paris, GP-B COLLABORATION — We report on very-long-baseline interferometry (VLBI) observations of IM Pegasi (HR 8703), the star used as a guide star for the NASA/Stanford gyroscope relativity mission, Gravity Probe B. We carried out VLBI observations at 35 epochs between January 1997 and July 2005, at a frequency of 8.4 GHz. The observations were all phase-referenced to the distant quasar 3C454.3. We present a selection of radio-images of IM Pegasi, which show radio source structures that vary in size from less than 1 to about 3 milliarcseconds. The morphology varies in a seemingly random fashion—the source was sometimes essentially unresolved, and at other times had either a core-halo, a double, or perhaps even a triple structure. Moreover, images from temporal subsets of several observing sessions exhibit structural evolution on hour time scales. We discuss the observed source structures, and whether they allow us to locate the region(s) emitting the radio radiation. Finally, we examine the implications of the radio morphology for the GP-B mission.

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Date submitted: 11 Jan 2007 Electronic form version 1.4