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The "Core" of the Quasar 3C454.3 as the Extragalactic Reference for the Proper Motion of the Gravity Probe B Guide Star NORBERT BARTEL, RYAN RANSOM, MICHAEL BIETENHOLZ, JERUSHA LEDERMAN, York University, DANIEL LEBACH, MICHAEL RATNER, IRWIN SHAPIRO, Harvard-Smithsonian CfA, LEONID PETROV, NVI, Inc./NASA GSFC, GP-B COLLABORATION — We used very-long-baseline interferometry (VLBI) radio observations at 8.4 GHz between 1997 and 2005 to determine the coordinates of the "core" of the quasar, 3C454.3, relative to two other extragalactic sources, B2250+194 and B2252+172, nearby on the sky. The core of 3C454.3 is stationary relative to these two sources, with the 1σ upper limit on its proper motion being 25 μas yr^{-1} in right ascension and 35 μas yr^{-1} in declination. The corresponding upper limit on the proper motion of this core with respect to the quasi-inertial reference frame determined from separate VLBI observations of many extragalactic radio sources, including B2250+194, is of similar magnitude. The core of 3C454.3 provides a sufficiently stable reference with which to measure the proper motion of the Gravity Probe B guide star, IM Pegasi, relative to the distant universe.

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