



A plot of this sort is produced with every update of the LCDB, and earlier versions and variations appear in numerous publications, perhaps most recently in Pravec et al., *Icarus* 233, 48-60, 2014. We refer the reader to that paper for a more complete description of the plot and the various lines plotted. Briefly, the horizontal "spin barrier" corresponds to the spin period at which a spherical "rubble pile" of density about 2 gm/cm^3 would "fly apart", that is, the spin rate where centrifugal force equals gravity at the equator. Below about 250 m diameter, the "spin barrier" ceases, implying that smaller asteroids have enough tensile strength to resist deforming or mass shedding in the tensile stress state implied. The solid sloping lines are lines of constant damping time scales of rotational wobble (tumbling). The absolute numbers should be taken with caution because rigidity and dissipation Q factors are not very well known, but the slopes are indicative. Also shown is a dotted line plotting the spin period at which the wobble damping time scale is equal to the collisional lifetime for that size object. One might expect this slope to better represent the boundary between tumbling and non-tumbling than the constant damping time scale lines – but it doesn't. Below the size where the spin barrier is effective, it is expected that rigidity may be much greater, hence tumbling may persist at much higher spin rates, which is apparent among these very small objects, some of them tumbling in spite of very fast spins. Lastly, the primary spin periods of binary asteroids are plotted in a separate color. The ones clustered right under the spin barrier are the multitude of asynchronous close binaries that probably form by YORP over-spinning to mass shedding or fission. Note the rather abrupt cessation of binaries at about the same size as the spin barrier ceases. Likely this is a result of most small bodies just continuing to spin up rather than shedding mass to form binaries. Indeed, if a single body has enough strength to hold itself together until it is spinning $2^{1/2}$ times faster than the spin barrier, so that the equatorial spin velocity is equal to escape velocity rather than just orbital velocity, if it then comes apart the pieces will escape from one another rather than forming a binary. Likewise, if the mass shedding model of binary formation is correct, we would not expect to see any binaries with primaries spinning faster than slightly above the spin barrier.