AST 300B – Spring 2018
In-class/take-home Problem Due: Wednesday January 24

3. The energy density of the Interstellar Radiation Field (ISRF), due to background starlight from the Milky Way Galaxy, is $u_{ISRF} \sim 1.05 \times 10^{-12}$ erg cm^{-3}.

(a) Calculate the distance from the Sun in AU that the observed energy density from the Sun is equal to the energy density of the ISRF. How does this distance compare to the aphelion of Sedna of 936 AU?

(b) What is the apparent magnitude m_V of the Sun at that distance where the energy densities are equal? How does the observed flux of the Sun at that distance compare (what is the ratio in flux) to the observed flux of the full moon seen from the Earth (m_V = -12.6 mag)? The absolute magnitude of the Sun is M_V = +4.83 mag.

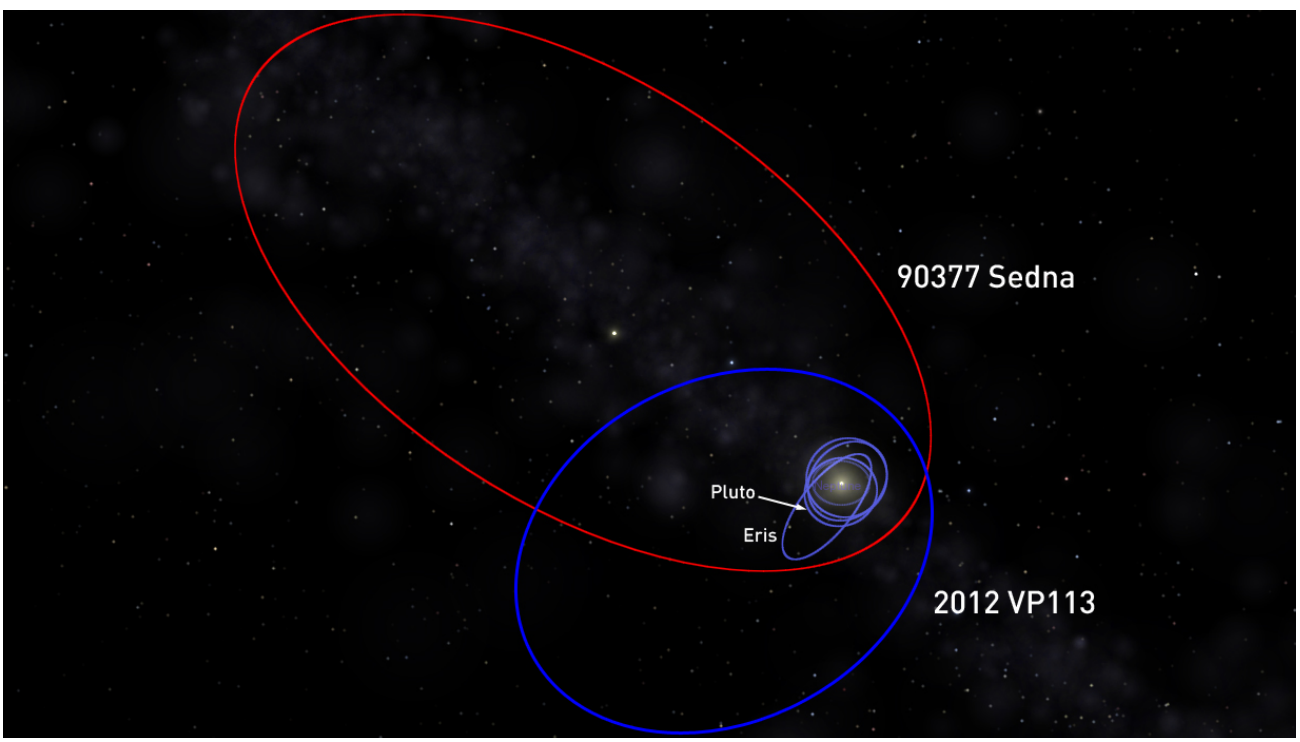

Figure: The orbits of extreme solar system objects Sedna and 2012 VP113 which both have perihelia > 75 AU. The LSST is likely to discover more of these "detached objects" in our Solar System.