



Earth's inner core fluctuating rotation

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It is uncertain whether the seismically-inferred longitudinal rotation of Earth's solid inner core with respect to the mantle is steady or fluctuating in time. We use numerical dynamo modelling to show that in the limit of vanishing fluid outer core viscosity which is appropriate for the Earth, the time-dependant part of inner core differential rotation should overcome the steady part by several orders of magnitude. For the predicted amplitude of rotation fluctuations to be compatible with the existing seismic observations and geodetic constraints, the magnitude of gravitational coupling between the mantle and inner core must be lower than previously thought. The weakness of steady inner core rotation additionally confirms the possibility of texturing mechanisms of the inner core surface by lower mantle thermal heterogeneities.