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## **Estimation of neutron star mass and radius from the high-frequency QPOs in GRB 200415A**

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Neutron stars are one of the most suitable environments for probing physics under extreme states. For example, the quasi-periodic oscillations (QPOs) observed in a giant flare occurred in a strongly magnetized neutron star (magnetar), are carrying crucial information for extracting the neutron star properties. To theoretically explain the observed QPOs in GRB 200415A, we systematically examine the crustal torsional oscillations, neglecting the magnetic effects. We find that the observed QPOs can be identified with several overtones of crustal oscillations, for well selected combination of the nuclear saturation parameters. Thus, we can inversely constrain the neutron star mass and radius for GRB 200415A by comparing them to the values of nuclear saturation parameters obtained from terrestrial experiments. We impose further constraints on the neutron star mass and radius while the candidate neutron star models are consistent with the constraints obtained from the other astronomical and experimental observations.

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