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V. Boyanov: Pseudospectrum of horizonless compact objects

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Recent investigations of the pseudospectrum in black hole spacetimes have shown that quasinormal mode frequencies suffer from spectral instabilities. We extend the pseudospectrum analysis to horizon- less exotic compact objects which possess a reflective surface arbitrarily close to the Schwarzschild radius, and find that their quasinormal modes also suffer from an overall spectral instability. Even though all the modes themselves decay monotonically, the pseudospectrum contours of equal resonance magnitude around the fundamental mode and the lowest overtones can cross the real axis into the unstable regime of the complex plane, unveiling the existence of nonmodal pseudo-resonances. A pseudospectrum analysis further predicts that fluctuations to the system may destabilize the object when next to leading-order effects are considered, as the triggering of pseudo-resonant growth can break the order- expansion of black-hole perturbation theory.

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