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Evidence for High Frequency QPOs in the Black Hole Candidate EXO 1846-031¹ TOD STROHMAYER, Astrophysics Science Division, NASA's Goddard Space Flight Center, JEROEN HOMAN, Eureka Scientific SRON, DIEGO ALTAMIRANO, Physics Astronomy, University of Southampton, ZAVEN ARZOU-MANIAN, PETER BULT, KEITH GENDREAU, Astrophysics Science Division, NASA's Goddard Space Flight Center, JON MILLER, Department of Astronomy, University of Michigan, RON REMILLARD, MIT Kavli Institute for Astrophysics and Space Research — We present evidence for a pair of 3:2 ratio high frequency quasi-periodic oscillations (HFQPO) at 500 and 750 Hz in the X-ray flux from the black hole candidate EXO 1846–031 in observations made with the *Neutron Star Interior Composition Explorer (NICER)*. The source went into outburst in late July, 2019 after 34 years in quiescence, with *NICER* monitoring beginning on 31 July. An average power spectrum accumulated in the 1 - 6 keV band over the initial 9 day intensity rise shows evidence at the 4σ significance level for a HFQPO at 500 Hz, with a fractional amplitude (rms) of 3.3%, and coherence $Q = \nu/\Delta\nu \approx 20$. A second, weaker feature is also evident at 750 Hz, consistent with a 3:2 relationship with the 500 Hz QPO. Assessing the significance of both features together yields an overall significance at the 4.4σ level. The source spectral state evolves from a hard intermediate (or steep power-law) state to a soft-intermediate state during the outburst rise, states known to be associated with HFQPO in other black hole systems. Based on the observed inverse mass scaling of 3:2 ratio black hole HFQPOs the detection of 500 and 750 Hz signals in EXO 1846–031 would suggest a mass of $3.24 \pm 0.14 M_{\odot}$.

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