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Three-Hair Newtonian Relations for Rotating Stars LEO STEIN, Cornell University, KENT YAGI, NICOLAS YUNES, Montana State University — Astrophysical black holes can be completely described by their mass and spin, as seen in the no-hair theorems. This was not expected to hold for stars because of their internal structure. We analytically find that arbitrarily-rapidly uniformly-rotating stars can still be completely described by only three numbers (mass, spin and quadrupole moment) in the Newtonian limit. Surprisingly, this description is approximately universal (independent of internal structure) for low multipole order, analytically confirming previous numerical results in full general relativity.

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