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ARDENT: including dynamical constraints in RV detection limits

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The exact role of outer giant planets in the formation of super-Earths and sub-Neptunes remains unclear. Observationally, measuring occurrence rates of these planet populations brings crucial insights, and RV surveys play a major role in this effort. While large sample sizes are key to obtain precise occurrence rates, strong detection limits on each system are equally important. Commonly, RV detection limits are computed based on injection-recovery tests in a data-driven approach. Dynamical viability of the injected planets is omitted. Yet, planet-planet gravitational interactions can have an important impact on the resulting detection limits. In this presentation I will introduce ARDENT, an open-source Python code for the fast and efficient computation of dynamical detection limits (i.e. detection limits that include stability constraints). It combines both analytical and numerical stability criteria to balance computation time and reliability. With ARDENT, I will demonstrate that accounting for gravitational interactions significantly strengthens the detection limits in giant planet systems.

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