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Gravity waves on extrasolar giant planets

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We study momentum and energy transport by gravity waves on extrasolar giant planets, using a robust, one-dimensional numerical model. The model is validated on observations of gravity waves in the atmospheres of solar system planets. Vertical wave propagations in atmospheres with different temperature and mean flow structures, compositions, and dissipation profiles are analyzed. Not all waves propagate. Propagation depends sensitively on the equivalent depth. Some implications of the presence of critical levels are discussed for "hot Jupiter" atmospheric flow and temperature structure.