

# Colloquium Talk

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## A variational derivation of $\beta$ -plane approximations for flow on rotating spheres

Wednesday, January 24, 2018

at 15:00 h

ESI, Boltzmann Lecture Hall

**Abstract:** Starting from Hamilton's principle on a rotating sphere, we derive a series of successively more accurate  $\beta$ -plane approximations to capture the latitude-dependence of the angle between the rotation vector and the local vertical in pseudo-Cartesian geometry. Each approximation inherits exact conservation laws for an energy, angular momentum and potential vorticity via Noether's theorem. The approximations differ in their treatments of the locally horizontal component of the rotation vector, the component that is usually neglected in atmosphere/ocean fluid dynamics under the traditional approximation.

A. Constantin

January 19, 2018