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Yuan Pei* (yuan.pei@wwu.edu), 516 High St., MS-9063, Bellingham, WA 98225, and **Adam Larios** and **Leo Rebholz**. *Velocity-vorticity-Voigt model for PDEs in fluid dynamics.*

In this talk, we propose the so-called 3D velocity-vorticity-Voigt (VVV) model for Navier-Stokes equations as well as Boussinesq equations. We add a Voigt regularization term to the momentum equation in velocity-vorticity formulation without regularizing the vorticity. We prove global well-posedness and regularity of this model along with an energy identity. We also show convergence of the model's velocity and vorticity to their counterparts in the 3D Navier-Stokes equations as the Voigt modeling parameter tends to zero. Similar discussion will be given for the Boussinesq model with thermal fluctuation. Part of the work is jointly with Adam Larios and Leo Rebholz. (Received August 24, 2020)