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**Matthew Novack\*** (mnovack@math.utexas.edu) and **Alexis Vasseur**. *Global Classical Solutions to the 3D Quasi-Geostrophic System*.

We show the existence of global in time classical solutions to the 3D quasi-geostrophic system with Ekman pumping for any smooth initial value (possibly large). This system couples an inviscid transport equation in  $\mathbb{R}_+^3$  with an equation on the boundary satisfied by the trace. The proof combines the De Giorgi regularization effect on the boundary  $z = 0$  –similar to the so called surface quasi-geostrophic equation– with Beale-Kato-Majda techniques to propagate regularity for  $z > 0$ . A bootstrapping argument combining potential theory and Littlewood-Paley techniques is used to strengthen the regularization effect on the trace up to the Besov space  $\dot{B}_{\infty,\infty}^1$ . (Received February 18, 2018)