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Nonuniqueness of weak solutions to the SQG equation

We prove that weak solutions of the inviscid SQG equations are not unique, thereby answering an open problem posed by De Lellis and Szekelyhidi Jr. Moreover, we show that weak solutions of the dissipative SQG equation are not unique, even if the fractional dissipation is stronger than the square root of the Laplacian. This talk is based on a joint work with T. Buckmaster and S. Shkoller.