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Critical well-posedness for the derivative nonlinear Schrödinger equation on the line

This talk focuses on the well-posedness of the derivative nonlinear Schrödinger equation on the line. This model is known to be completely integrable and L^2-critical with respect to scaling. However, until recently not much was known regarding the well-posedness of the equation below $H^{\frac{1}{2}}$. In this talk we prove that the problem is well-posed in the critical space on the line, highlighting several recent results that led to this resolution. This is joint work with Benjamin Harrop-Griffiths, Rowan Killip, and Monica Visan.