

Title: On the well-posedness of the initial value problem for the MMT model*

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Abstract: In this talk, we present results on the well-posedness of the initial value problem (IVP) for the two-parameter family of dispersive wave equations known as the **Majda–McLaughlin–Tabak (MMT) model**, which arises in the theory of weak turbulence of random waves. The MMT model can be viewed as a derivative nonlinear Schrödinger (dNLS) equation in which both the dispersion and the nonlinearity involve nonlocal fractional derivatives.

The main objectives of this work are twofold. First, we establish a sharp well-posedness theory for the MMT model. Second, we identify the critical relationship between the order of the derivative in the nonlinearity and the order of dispersion that guarantees well-posedness. As a consequence, we obtain sharp well-posedness results for a broader class of nonlocal fractional dNLS equations. In particular, our results settle the endpoint regularity case that had previously remained open in the literature.

**Joint work with James Patterson and Yuzhao Wang from the University of Birmingham, UK.*