Dynamics of rogue waves in the Davey-Stewartson equations

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Abstract:

General rogue waves in the Davey-Stewartson-I and Davey-Stewartson-II equations are derived by the bilinear method, and the solutions are given through determinants. It is shown that the simplest (fundamental) rogue waves are line rogue waves which arise from the constant background in a line profile and then retreat back to the constant background again. It is also shown that multi-rogue waves describe the interaction between several fundamental rogue waves, and higher-order rogue waves exhibit different and novel dynamics. Under certain parameter conditions, rogue waves in the Davey-Stewartson-II equation can blow up to infinity in finite time at isolated spatial points, i.e., exploding rogue waves exist in the Davey-Stewartson-II equation. This talk is based on materials in Refs. [1, 2]

References:

1. Y. Ohta and J. Yang, "Rogue waves in the Davey-Stewartson-I equation", Phys. Rev. E 86, 036604 (2012).
2. Y. Ohta and J. Yang, "Dynamics of rogue waves in the Davey-Stewartson II equation", to appear in J. Phys. A (2013) (see also arXiv:1212.0152 [nlin.SI]).