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Dispersive Shock Wave Collisions in Bose-Einstein Condensates and Light MARK HOEFER, National Institute of Standards and Technology, MARK ABLOWITZ, Applied Math Department, University of Colorado, Boulder — When two classical shock waves collide, the interaction is relatively simple and is explained by classical hyperbolic system theory and jump/entropy conditions. An analogous theory for the interaction of two dispersive shock waves (DSWs) is presented. Two cases will be considered: i) a collision where two DSWs are propagating directly toward one another, ii) merging where a faster DSW overtakes a slower one. It is shown that, after a complicated quasi-periodic or multi-phase region is created, the DSW interaction process results in: i) two single DSWs propagating away from one another in the collision case, ii) a single, larger DSW representing the merger of the original two DSWs in the merging case. Remarkably, these results coincide exactly with their classical shock wave counterpart. These results have direct application to Bose-Einstein condensates and nonlinear optics.

Mark Hoefer
National Institute of Standards and Technology

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