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Rigorous justification of the short-pulse equation

We prove that the short-pulse equation, which is derived from Maxwell equations with formal asymptotic methods, can be rigorously justified. The justification procedure applies to small-norm solutions of the short-pulse equation. Although the small-norm solutions exist for infinite times and include modulated pulses and their elastic interactions, the error bound for arbitrary initial data can only be controlled over finite time intervals. This is the joint work with Guido Schneider, University of Stuttgart.