

NONLINEAR TEMPORAL MODULATION OF
PULSAR RADIOEMISSION¹

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ABSTRACT: We discuss a nonlinear plasma theory for self-modulation of pulsar radio pulses. A nonlinear Schrödinger equation is derived for strong electromagnetic waves propagating in an electron-positron plasma. The nonlinearities arising from wave intensity induced particle mass variation may excite the modulational instability of circularly and linearly polarized pulsar radiation. The resulting wave envelopes can take the form of periodic wave trains or solitons. These nonlinear stationary waveforms may account for the formation of pulsar microstructures.

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