

**Instability of Long Driving Beams in Plasma Wakefield Accelerators, K.V. LOTOV, BINP, Novosibirsk** - In plasma wakefield accelerators, long (as compared to the wakefield period) driving beams are subject to the vigorous transverse two-stream instability, the nonlinear stage of which is numerically studied. If only one mode of the instability grows up in the system (as in the case of a sharp beam front), then the beam quickly get modulated, the instability saturates, and the generated wakefield increases; further propagation of the modulated beam is stable. Simultaneous growth of several unstable modes (which is the case for a smooth beam front) completely destroys the beam in the time of several betatron oscillations. The trains of short bunches are stable.