Laminar Flow in non-relativistic Intense Proton Beams, J. ROSENZWEIG, UCLA; L. SERAFINI, INFN-MILAN - An approach to the envelope description of laminar non-relativistic particle beams is presented, which is intended to describe a new kind of equilibrium flow for strongly space charge dominated proton beams in RF linacs. The analysis is based on the extension of the invariant envelope concept, which has been recently introduced in the field of RF photo-injectors for high brightness electron beams, to non-relativistic particle beams, which are dominated by coherent plasma oscillations in their envelope behavior, with negligible contributions from the betatron motion due to the thermal or nonlinear components of the transverse emittance. Under the assumption of laminarity, an exact solution of the envelope equation is found for an axisymmetric beam accelerated in a RF linac. This envelope mode is shown to be stable to injection mismatches at injection. The impact of such a laminar beam flow on the design of high intensity proton linacs is discussed, with emphasis on issues of beam halo production.