

A Review of New Manifestations of Collective Effects, F. RUGGIERO, CERN - The design of high performance 'factories', large hadron colliders and synchrotron light sources calls for a large number of high intensity bunches. This imposes feedback systems and a tight impedance budget to control conventional instabilities, some of which are differently emphasized depending on the ongoing evolution of beam parameters. Ion trapping, for example, is no longer reported as a problem for the new generation of very low emittance electron storage rings. However new mechanisms appear, such as the fast ion instability for electron beams and the build-up of electron clouds for positron or proton beams. We review these new manifestations of collective phenomena, essentially related to the single-pass interaction of a bunch train with foreign or 'gaijin' particles, and discuss their dependence on several machine parameters such as bunch intensity and spacing. We also summarize possible cures and positive as well as negative experimental evidence in existing accelerators.