

**A 3-Dimensional Simulation of Collective Effects in Particle Accelerators, A. WAGNER, B. ZOTTER,**  
CERN - Collective effects due to the impedance of structures along the vacuum chamber can limit the performance of accelerators and storage rings. In particular in LEP, transverse impedances are limiting single bunch currents in the vertical, but - to a somewhat lesser degree - also in the horizontal direction. The head-tail motion generally appears in one or the other direction. Previous simulations have taken into account only a single transverse dimension. This neglects possible effects in both transverse directions which could lead to coupling. The 3-D program is based on the simulation program TRISIM, which uses triangular basis functions to represent the particle distributions in 2 dimensions and has shown good agreement with observations in a single transverse plane. The results of the 3-D simulations will be compared with measurements on LEP.