

Filling and Beam Loading in TESLA Superstructures, M. DOHLUS, DESY; D. HECHT, U. VAN RIENEN, University Rostock - The new design of the accelerating structures for TESLA, the so-called superstructures composed out of several multicell cavities, is studied. Here a superstructure is composed out of four seven-cell superconducting structures, e.g. in total 28 coupled cells. A central question is the filling characteristics of the superstructure since acceleration already starts during the filling time. Each superstructure is fed by one coupler only. The filling and the beam loading of the superstructure is studied in this paper with a model taking into account the lowest 28 monopole modes. The calculation of the monopole modes is done by means of discretization with FIT. The large number of cells and the fact that the eigenvalues are clustered puts some difficulty to the mode computation which is carefully carried out to get reliable results. The input coupler is simulated by a driven current loop. This model leads to a coupled set of differential equations which is set up and solved in time. Comparisons with earlier simulations by J. Sekutowicz and M. Ferrario [1] are presented.

- [1] J. Sekutowicz, M. Ferrario, C. Tang: Superconducting Superstructure; LC97, Sept/Oct. 97, Zvenigorod, Russia.