

**A Superconducting RF Cavity for Bunch Compression of the High-Intensity SPS Proton Beam at Transfer to LHC, T. BOHL, D. BOUSSARD, T. LINNECAR, V. RODEL, CERN -**

The bunch length of the high-intensity proton beam ejected from the CERN SPS into LHC must be reduced to fit into the 400 MHz LHC buckets. This will be done using a new 400 MHz superconducting system in the SPS. Above transition bunch compression is obtained with a cavity tuned slightly below the bunch frequency, thus giving a very high capacitive impedance. Such a system would, however, be extremely critical and very likely unstable without strong RF feedback. To keep the required RF power at an acceptable level during the ramp, the beam, which occupies only a third of the SPS, is accelerated in a variable harmonic mode to place the beam spectrum substantially above the cavity bandwidth. On the flat top, when the beam spectrum is moved towards the cavity resonance, the phase and amplitude of the reference voltage, including its modulation at the revolution frequency are programmed to keep the required RF power to a minimum. The scheme is described in detail, together with the prototype 400 MHz superconducting cavity installed in the SPS. Initial tests obtained with beam will also be reported.