

Where Are We after 30 Years of Electron Cooling,
H. DANARED, Manne Siegbahn Laboratory - Electron cooling was proposed by G.I. Budker in 1996 as a method for cooling and accumulation of antiprotons, and was demonstrated at the NAP-M ring in Novosibirsk in 1974. Although stochastic cooling today is the method favoured for antiproton accumulation, electron cooling has up to now been implemented at about a dozen storage rings. It has been used for cooling of a large number of different particle species, from protons and antiprotons to bare uranium nuclei and molecular ions. Cooling has been performed at ion energies ranging between 300 keV/u to 470 MeV/u. Electron cooling is also considered for 8 GeV protons and antiprotons at Fermilab. Apart from improvement of the beam emittance and accumulation of ions, many electron coolers are also used as electron targets for experiments studying the interaction between free ions and electrons. The presentation summarizes the progress of electron cooling since 1966, reviews current applications, and indicates directions for future developments.