

How Much Pumping does an Electron Storage Ring REALLY Need?, W. BIALOWONS AND J. KOUPSIDIS, DESY - HERA was designed for the collision of protons with electrons and positrons. Two interaction regions were laid out for colliding beam detectors. For the physics program it is essential that the collider experiments can take data with both sorts of leptons. In HERA the operation with electrons is rather different from the operation with positrons. At high intensities the lifetime of the electron beam drops while the energy is ramped from 12 to 27.5 GeV. This beam lifetime instability is related to the operation of the integrated ion sputter pumps. The current understanding of this problem with electrons is as follows: During operation the pumps release micro-particles that are then positively ionized by the circulating beam. The negative potential of the electron beam traps the particles and the beam lifetime is reduced by bremsstrahlung. The problem should be solved after passive pumps have been installed. In the Winter shut down 1997/98 the integrated dipole ion sputter pumps will be exchanged for passive NEG-pumps. During machine shifts the high voltage of all dipole pumps in the electron storage ring was switched off to simulate the NEG-pump operation. The remaining nominal pumping speed in the arcs was about 15%. Surprisingly subsequent runs with electron currents of up to 40 mA and improved lifetime of about 5 h were observed. The results of the operation with electrons are presented in detail, together with possible consequences for the vacuum systems of future electron storage rings.