

Abstract Submitted  
for the GEC06 Meeting of  
The American Physical Society

**Looking for information in the  $Q$  of the hairpin probe** NICHOLAS BRAITHWAITE, EVA VASEKOVA, JAFAR AL-KUZEE, The Open University, THE OPEN UNIVERSITY TEAM — A microwave resonator hairpin probe is used to measure the electron density of low pressure low temperature plasma. The probe acts as a quarter wave transmission line that is resonant at a frequency determined by the dielectric properties of the surrounding medium. The quality factor  $Q$  of the hairpin resonance has been studied as a function of the pressure of the discharge gas and the power coupled to the discharge, for a number of gasses. The  $Q$  values were inferred from the Gaussian fitting of the recorded resonant curves of the probe. The theoretical values of the  $Q$  were calculated as a ratio of the energy stored in the cavity and the energy dissipated per one period. Since the dissipated energy depends on the collisions between electrons and the background gas, the quality factor tends to decrease with the gas number density, hence the pressure, as well as the electron number density. The measured values of  $Q$  were compared with the theoretical values and found to be in good agreement.

Nicholas Braithwaite  
The Open University

Date submitted: 16 Jun 2006

Electronic form version 1.4