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**Photoelectron Emission from Metal Surfaces Induced by Radiation Emitted  
by a 14 GHz Electron Cyclotron Resonance Ion Source**

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Previous measurements with a filament-driven multi-cusp arc discharge volume production H<sup>+</sup> ion source [1] suggest that photoelectron emission could contribute to properties of hydrogen ion source plasmas. In this study photoelectron emission measurements have been performed using a room-temperature 14 GHz ECR ion source. It is shown that the photoelectron emission from Al, Cu, and stainless steel (SAE 304) surfaces, which are common plasma chamber materials, is predominantly caused by plasma VUV-emission. Characteristic X-ray emission from the plasma has an insignificant contribution to photoelectron emission. In the measurement setup the radial line-of-sight plasma volume is between the poles of the sextupole magnetic field, i.e. photoelectron emission induced by direct wall bremsstrahlung is not observed. Photoelectron currents are measured as a function of microwave power with different magnetic field strengths, neutral gas pressures and plasma elements. The total photoelectron flux from the plasma chamber wall is estimated from the measured photoelectron currents by taking into account the measurement geometry. The total photoelectron flux is compared to estimated electron losses from the plasma in order to deduce the significance of the effect on ECR ion source plasma properties.

**References**

[1] J. Laulainen, T. Kalvas, H. Koivisto, J. Komppula, and O. Tarvainen, AIP Conf. Proc. 1655, 020007 (2015).