



## **Auroral arc modulation caused by the powerful HF ionosphere heating**

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In November 21, 2003 an ionosphere heating experiment was conducted in Tromso to investigate the optical effects caused by powerful HF pumping of the ionosphere. The optical emissions at 557.7 nm, 427.8 nm, and 630.0 nm were observed by two ALIS stations, one in Skibotn and another one in Kiruna. The ionospheric parameters were measured by the EISCAT UHF radar. From 16:40 to 19:09 UT the EISCAT Heating facility was operated at 4.04 MHz transmitting about 125 MW effective radiated power in X-mode with a 1-min-on and 1-min-off cycle. At 18:28 UT a weak auroral arc drifting southward came into the area illuminated by the heating beam. Only during the time when the arc was inside the heated volume strong variations at 557.7 nm and 427.8 nm were observed. Intensity enhancements of about five times for both emissions coincided with HF-pump “off” period. The emission intensification was observed not only inside the heating area but along the whole arc simultaneously. Such behavior of the aurora indicates modulation of the auroral electron flux in an area that is much larger than the region directly modified by the heating beam. One can question if the intensity variations in the auroral arc are caused by the HF heating. However, the EISCAT measurements show unusual significant enhancements of the electron temperature at altitude 110-120 km during the heater “on” periods for the same heating cycles. These enhancements clearly induced by the heating as well as observed ratio of the auroral emissions give us a possibility to conclude that in this experiment the auroral arc modification was caused by the powerful HF ionosphere heating.