



On the polarization of Saturn narrowband radio emissions

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The Cassini/RPWS (Radio and Plasma Wave Science) instrument has frequently detected narrowband radio emissions during Cassini's orbits around Saturn. These electromagnetic emissions are emitted at frequencies around 5 and 20 kHz and are believed to be created at the boundaries of Saturn's plasma disc in the inner magnetosphere. One important physical characteristic is their polarization, which can give us clues about their emission mode as well as source location. A significant fraction of Saturn narrowband emissions are highly circularly polarized radio emissions, and their measured rotation sense is opposite to SKR (Saturn Kilometric Radiation) for the component at 5 kHz and can be either left- or right-handed polarized for the narrowband emissions around 20 kHz. With Cassini at greater distance to Saturn, the narrowband emissions are often just weakly circularly polarized, and this depolarization could be the result of observing two oppositely polarized sources from different hemispheres. In any case, we could not detect linear polarization in Saturn narrowband radio emissions. Zero linear polarization is a necessary condition for applying direction finding with only two RPWS antennas.