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# The Variation of Magnetospheric Resonance with Changing Geomagnetic Conditions

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Resonance is a phenomenon common to many physical systems, including the closed magnetosphere. Ultralow frequency waves can be reflected by the ionosphere, forming standing waves along magnetospheric flux tubes. Hence, closed field lines have a set of eigenfrequencies, whose values are determined by the plasma distribution along the field line, the field line structure and the polarisation of the standing wave.
These eigenfrequencies can be measured with the cross-phase technique, which relies on the field lines in the vicinity of the measurement points resonating due to a broadband signal. Using ten years of magnetometer data, we study under what conditions this technique is most effective, or alternatively, when the field will resonate. By understanding the probability of resonance, we can make many inferences on the behaviour of the magnetosphere and try to understand its response to changing solar wind and geomagnetic conditions.
We can also measure how the eigenfrequencies change with such conditions. This can potentially tell us about the changing structure of the magnetosphere and its plasma content. Also evident is that the first and third harmonic of the field line are excited under different conditions, and that different harmonics may be excited at different latitudes.