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Advances on the Study of Coronal Extreme Ultraviolet Waves

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The hot and tenuous coronal plasma can support the propagation of various kinds of magnetohydrodynamic waves. In this talk, we mainly introduce two types of extreme ultraviolet (EUV) waves in the corona, namely, the large-scale, global EUV waves and the quasi-periodic fast-propagating (QFP) magnetosonic waves[1,2,3].

Globally propagating EUV waves are typically exhibit as single pulsed wavefront with a circular or simi-circular shape, and are intimately related to violent solar eruptions such as flares, coronal mass ejections and the chromosphere Moreton waves. Due to the launch of space solar telescopes in 1990s, large-scale EUV waves attracted a lot of attentions from solar physicists due to two long-debating topics, i.e., it is unclear that large-scale EUV waves were driven by coronal mass ejections or flares, and whether they are true MHD waves or pseudo waves caused by coronal reconfigurations. Thanks to the high spatiotemporal resolution and multi-angle observations provided by advanced space and ground-based solar telescopes in recent years, we have achieved deeper and complete understanding about the generation and physical properties of EUV waves.

QFP wave trains is a new wave phenomenon discovered by the Atmospheric Imaging Assembly (AIA) onboard the Solar Dynamics Observatory (SDO), which are seen to consist of multiple coherent and concentric wavefronts emanating successively near the epicenter of the accompanying flare. QFP wave trains can be classified into narrow and broad types, which are propagated along and across coronal loops, respectively. This talk will introduce the basic physical properties and proposed possible excitation mechanisms, and their possible relationship to the large-scale EUV waves.

The study of these coronal EUV waves is important for us to understanding the coronal property through the technique of coronal seismology, solar eruption and enigmatic solar problems such as coronal heating and the acceleration of fast solar wind. In summary, we will present the main advances on the study of the two types of EUV waves in recent years, including observational and theoretical results.

References

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