



Recent advances in equatorial noise study inspired by Prof. Richard M Thorne

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Equatorial noise, also known as fast magnetosonic waves or ion Bernstein mode waves, are electromagnetic emissions confined within a few degrees of the equator, occurring above the proton gyrofrequency and below the lower hybrid resonance frequency typically a few Hz to several hundreds of Hz. It has been shown that these waves undergo Landau resonance interaction responsible for electron acceleration, and additional transit-time scattering because of spatial confinement near the equator. Furthermore, magnetosonic waves can also resonate with bounce motion of energetic electrons including those of pitch angle 90 degrees. This is especially important on dynamics of equatorially mirroring energetic electrons, which poses an interesting scientific problem because they generally cannot gyro-resonate with any known plasma waves and hence cannot be scattered down to lower pitch angles.

In this presentation, we will summarize Prof. Thorne's contribution to our understanding of excitation and propagation of equatorial noises and their interaction with magnetospheric particles. We will also show recent advances in this topic, and share some stories on how he inspired the author personally in doing sciences.