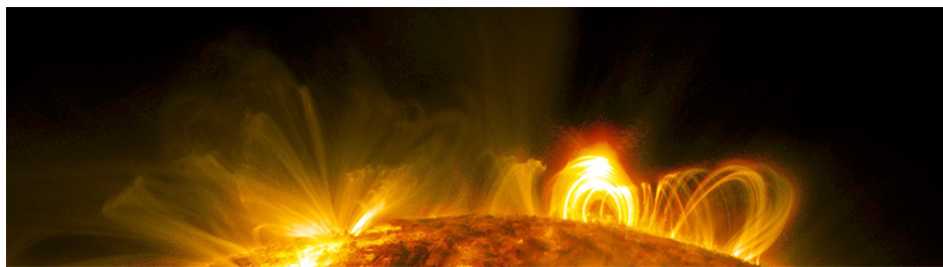


## Particle Acceleration in Solar Flares and the Plasma Universe – Deciphering its features under magnetic reconnection



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### The physics of wave particle interaction in Lower Hybrid Oscillation

*Thursday, 18 November 2021 09:45 (1 hour)*

Lower Hybrid Oscillation (LHO) is a coupled oscillation between ions and electrons under cyclotron motion by coulomb force. The condition for LHO is the presence of a local electric field in a weakly magnetised plasma. A theoretical study shows that, in a collision less magnetised gravitational plasma, this condition is satisfied where the Lower Hybrid (LH) coupling is made possible by an electric field induced by the gravitational drift of ions. Analysis of the dispersion relation shows that the LHO is an effective mechanism for wave particle interaction in which both the electrons and ions are absorbing photons (electromagnetic waves) via cyclotron resonance. It is also noted that the electron cyclotron damping is a multi-wavelength absorption, which strengthens the LH coupling while the ion cyclotron damping is a multi-photon absorption which leads to the multiple ionisation and results in the emission of high energy radiation. A general formula for the ion cyclotron resonant emission has been derived from the dispersion relation, which is truly reflecting the mechanism of the LHO and found to be useful for analysing any spectral emission from the gravitational plasma. An attempt is made to analyse the EUV emission lines of solar and aurora spectrum and found to be very interesting. In a conclusive note, “the LHO seems to be a very fundamental oscillation, which is holding the truth about particle acceleration by cyclotron resonance and more study would be very significant”.

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