# Recent Progress in ULF Wave's Interaction with Cold Electrons and Ions in the Earth's Inner Magnetosphere

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In terms of particle energy and species, the inner magnetosphere can be divided into three regions, including the inner and outer radiation belts, ring current and plasmasphere. It is widely accepted that ULF waves can cause the acceleration and transport of outer radiation belt electrons and ring current ions through drift/drift-bounce resonance. Recent studies in the last two or three years presented the observational evidence of cold particle acceleration/energization by ULF waves. Cold plasmaspheric electrons can be rapidly accelerated by the poloidal-mode ULF wave electric fields via drift-bounce resonance, which show bi-directional pitch angle distributions, phase space density enhancement and density enhancement. The spatial distributions in the equatorial plane, occurrence conditions as well as resonant energy range of the cold plasmaspheric electrons also have been investigated using six years Van Allen Probes data. Different species of cold plasmaspheric ions can be energized to different energies due to the mass dependence of **E**x**B** effect by ULF waves. Besides, observations suggest that the polarization drift can lead to the real acceleration of cold $O^+$ ions. The recent progress can promote our understanding of ULF waves' impact on the cold particles, and let the science community realize the potential research value of ULF waves in the dynamics of cold plasma environment.

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