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ポスター 3 ：11/6　AM1/AM2 （9:00-12:30）

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Development of a resonance scattering lidar for simultaneous observation of meteoric metal atom and ion

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In a transition region between neutral atmosphere and geospace plasma (80 - 500 km), the vertical mass transport process has still to be revealed because simultaneous measurement of neutral atmosphere and plasma is quite difficult. There are layers of metal atoms and ions in the mesosphere and lower-thermosphere region produced by meteoric ablation. The meteoric ablation occurs mainly around 80-120 km, so metal layers are usually observed below 120 km. However, there have been many recent reports confirming the presence of metal atoms at altitudes higher than that by resonant scattering lidar observations. A simulation study conducted by Chu and Yu (2017) to investigate a possible source of thermospheric iron layers observed at McMurdo Station in Antarctica suggested that metal atoms may be incorporated into vertical transport in geospace with ionization and neutralization, moving over a wide altitude range. Simultaneous observation of the vertical density profiles of metal atoms and ions and tracking their temporal changes could provide observational evidence of large-scale vertical mass transport in the transition region. Calcium is the only metal that can be observed in both atom (Ca) and ion (Ca^+) by ground-based resonant scattering lidar observations. To measure temporal variation in vertical density distributions of Ca and Ca^+, as a dynamical tracer in this region, we started to develop a resonance scattering lidar system, which has an injection-locked Ti:Sapphire laser; a multi-frequency, nanosecond pulse, and a broad frequency tenability. In this presentation, we will introduce the new lidar system and show some preliminary results of test observations.