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Characteristics of Fragmented Aurora-like Emissions (FAEs)

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We present observations of a new type of small-scale aurora-like feature, which is further referred to as fragmented aurora-like emission(s) (FAEs).

They seem to appear in two categories – randomly occurring individual FAEs and wave-like structures with regular spacing between FAEs alongside auroral arcs. FAEs show horizontal sizes typically below 20 km, a lack of field-aligned emission extent, and short lifetimes of less than a minute. Emissions were observed at the 557.7 nm line of atomic oxygen and at 673.0 nm (N_2 ; first positive band system) but not at the 427.8 nm emission of N_2^+ or the 777.4 nm line of atomic oxygen. This suggests an upper limit to the energy that can be produced by the generating mechanism. Their lack of field-aligned extent and 777.4 nm emissions indicates a different generation mechanism than for aurorae, which are caused by particle precipitation. Possible sources are Farley–Buneman instabilities or electrostatic ion cyclotron waves.