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Fine structure of Auroral Kilometric Radiation observed by the Cluster Wideband Receiver

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Auroral kilometric radiation (AKR) is a strong terrestrial radio emission at frequencies below 1 MHz from source regions at high latitudes along auroral magnetic field lines. Non-thermal electron distributions (e.g. loss-cone or shell distribution) provide the free energy that is converted into electromagnetic energy via the cyclotron maser instability. Improved instrumentation installed on modern spacecraft enabled observations of spectral fine structures in AKR which is composed of discrete emissions seen at narrow frequency bandwidths (<1 kHz) and short time scales below 1 second. We will present data from the Cluster mission, where each of the four satellites is equipped with a Wideband Receiver (WBD). The extensive Cluster-WBD dataset is mostly unexplored to date, despite that a few case studies already analyzed specific AKR fine structures like striations, narrowband emissions drifting up and down in frequency or so-called V- or U-events. We will provide an overview of the large variety of AKR fine structures from Cluster-WBD and introduce a classification scheme.