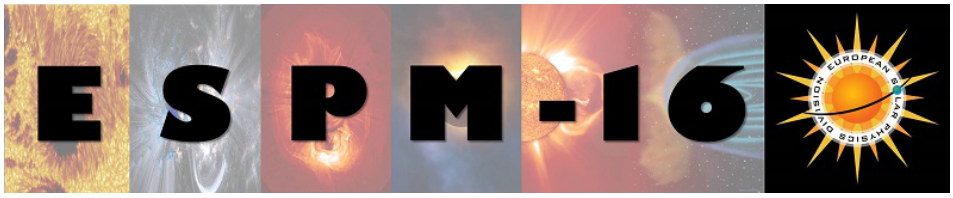

Contribution ID: **373** Type: **Poster**

Observations and simulations of small-scale dynamic events with ALMA

Tuesday 7 September 2021 10:05 (13 minutes)

Observations of the Sun with the Atacama Large Millimeter/sub-millimeter Array (ALMA) facilitate chromospheric studies at high spatial and temporal resolution.
We strive to evaluate observational data and determine the origin of the detected small-scale structures with the support of numerical simulations.
For this purpose, high-cadence Bifrost 3D simulations and radiative transfer calculations are used to construct brightness temperature maps at wavelengths corresponding to the spectral bands of ALMA.
A detailed study of shock waves in the simulation is made to characterise the corresponding signatures at mm-wavelengths.
Several hundred small-scale dynamic features are detected in the (~40 min) observation, which agrees well with shock wave signatures.
The ALMA bands effectively trace shock waves through the chromosphere. It is shown by degrading the resolution of the mm-maps, to what degree the dynamic signatures are expected to be observable, at different wavelengths and spatial resolutions. The specific spatial scales and contrasts, together with the size and shape of the effective resolution element, are very important for how the dynamic signatures are perceived.
In addition, the formation heights of the mm-wavelength radiation in connection to the small-scale dynamics is investigated and it is shown that the slope of brightness temperature within a receiver band can be used to give an estimation of the slope of the local gas temperature at the sampled layers and provides a better understanding of the underlying physical conditions of the dynamic features.

Author: EKLUND, Henrik (Rosseland Centre for Solar Physics, University of Oslo)

Presenter: EKLUND, Henrik (Rosseland Centre for Solar Physics, University of Oslo)

Session Classification: Poster Session 3.2

Track Classification: Session 2 - The Solar Atmosphere: Heating, Dynamics and Coupling