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Complex interactions of the shock wave and ambient coronal structures

We present the study of the flare and coronal mass ejection (CME) event observed on 2 November 2021. The double-peak M1.7 GOES X-class flare originated from active region AR 12891 with has beta configuration of its photospheric magnetic field. The CME propagated strongly southward from the Sun-earth line. The CME-flare event was associated with a complex radio event consisting of multiple lane type II radio burst, Type III radio bursts and a Type IV continuum emission. The type II radio emission in the metric range shows two distinctive regimes indicating complex interaction of the shock wave and the ambient coronal structures. The type III radio bursts start mostly in the space-based observations suggesting the lack of the open field lines neighbouring the source region of the CME in the low corona and possible association with the shock wave (so called shock-associated type III bursts).

With the aim to understand complex relationship of the shock wave and its driver we combine analysis of radio observations and modelling of the fast Halo CME (velocity of about 1500 km/s). We employ direction finding technique for radio observations and the 3D MHD model EUHFORIA (European Heliospheric FORecasting Information Asset) for modelling of the CME and background solar wind.

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