# A solar burst with a spectral component observed only above 100 GHz during an M class flare

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We study the M6.8 class flare on 20 December, 2002, which shows a submillimeter radio spectral component different from the microwave classical burst. Two successive bursts of 2 minutes duration and separated by 2 minutes occurred in active region (AR) 10226, around 13:15 UT. Submillimeter flux density measured by the Solar Submillimeter Telescope (SST) is used, in addition to microwave total Sun patrol telescope observations. Images with H$\alpha$ filters, from the H$\alpha$ Solar Telescope for Argentina (HASTA), and extreme UV observations, from the Extreme-ultraviolet Imaging Telescope (EIT) aboard the Solar and Heliospheric Observatory (SOHO), are used to characterize the flaring region. An extensive analysis of the magnetic topology evolution is derived from the Michelson Doppler Imager (SOHO, MDI). The submillimeter component is only observed at 212 GHz. We have upper limits for the emission at 89.4 and 405 GHz, which are smaller than the observed flux density at 212 GHz. The analysis of the magnetic topology reveals a very compact and complex system of arches that reconnects at low heights, while from the soft X-ray observations we deduce that the flaring area is dense ($n \sim 10^{12}$ cm$^{-3}$). The reconnected arches are anchored in regions with magnetic field intensity differing in an order of magnitude. Then, we conclude that the microwave emission comes from mildly relativistic electrons spiraling down along the reconnected loops. A very small portion of the accelerated electrons can reach the footpoint with the stronger magnetic field (2000 G) and produce synchrotron emission, which is observed at submillimeter frequencies. The finding of a submillimeter burst component with the characteristics discussed above in a medium size flare indicates that the phenomenon is more universal than shown until now.