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Leptonic and lepto-hadronic time-dependent spectral modeling of VER J0521+211 during the large outburst of February-March 2020.

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The high-synchrotron-peaked blazar VER J0521+211 was discovered in 2009 by VERITAS and is located at an unknown distance. In February 2020, the VERITAS collaboration alerted the multi-messenger community of an ongoing flare from the source, followed by a multi-frequency monitoring campaign led by MAGIC, covering energies from radio to very-high-energy (VHE, E>100GeV) which allowed to observe the source in VHE for 6 consecutive nights. Out of these observations, a statistical upper limit to the source redshift at z<0.243 was set using Fermi-LAT and MAGIC data, a value consistent with lower limits derived from optical spectroscopy. The modeling of the broadband spectral energy distribution (SED) and its night-wise evolution is also presented using two types of models: i) a leptonic two-zone synchrotron-self-Compton scenario; ii) a lepto-hadronic one-zone scenario. Both scenarios allow to reproduce the observed SEDs and their night-wise evolution, and have implications on optical polarization and production of neutrinos. For the first scenario, optical polarimetry measurements were compared with the predictions from the evolution of the two-zones. For the second scenario, limits on the production of neutrinos and enhanced photon emission at ultra-high-energies (E>100TeV) from π^0 decay were computed.

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