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Over-dense radio meteor reflections in a forward scatter set-up

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Radio meteor detection systems typically show a qualitatively different response for the brighter and longer-lasting meteors. This response is believed to be caused by quasi-specular reflection of the radio signal from over-dense ionization regions created by the meteor. These signatures can take on a variety of shapes in time-frequency spectrograms, including the so-called epsilon-shaped radio meteor echoes. The present contribution examines various formation scenarios, based on a physical description of the electron density distribution in the expanding meteor trail, as well as on an analysis of the reflection geometry for the case of a forward scatter radio meteor detection set-up. A comparison is made with selected over-dense meteor echoes from the BRAMS radio meteor system.