Q44a Further testing of amorphous dust model toward high precision foreground removal from CMB data

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The anomalous microwave emission (AME) is a component of microwave emission observed ubiquitously in the sky in addition to thermal dust, free-free and synchrotron emission. It appears as the excess emission in the frequency range of 10 to 50GHz. It is clear that the AME is coming from an ingredient associated with interstellar dust because of the spatial correlation between the intensity of the AME and thermal dust emission (Davis et al. 2006). However, the emission mechanism of the AME has not been elucidated yet.

We have at the first time constructed the model of the intensity and polarization spectrum energy densities (SEDs) of thermal emission from amorphous dust based on a two-level state (TLS) model which describes the low temperature properties of amorphous material very well. We tested our model by fitting both intensity and polarization SEDs of Perseus and W43 molecular clouds in the frequency range of a few GHz through a few THz. We showed that our model gives satisfactory fits to the observational data. We showed a new possibility that the AME is originated from the resonance emission of the TLS (Nashimoto et al. in prep; ASJ annual meeting in spring 2019, Q16a). To achieve one of our final goals is improving accuracy of foreground removal from the CMB data, we are performing further tests of our model by fitting various dusty regions including diffuse interstellar dust emission regions. I'm going to report some of these results.