

# Thermal Model Fitting NEOWISE Data – Interesting Cases and Issues

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The NEOWISE observational data set is a potential treasure trove for thermal modeling because it contains four band IR observations for thousands of asteroids. A carefully curated observational data set derived from the four-band fully cryogenic mission is used to fit the NEATM. In many cases the data allows straightforward application of the NEATM with excellent fits in all the four bands. However, there are other cases where the best fit NEATM on an overall basis has poor fits in some bands. Numerous possible causes are considered, including errors in the observational data, but it is also worth exploring whether this is due to a previously unrecognized or under-appreciated effect. A new approach to visualizing multi-band NEATM is presented which derives the region in parameter space that admits a solution that is a best fit in each band. It can be performed both on aggregate data sets as well as on individual observations. This approach makes it simple to demonstrate that most of the problematic cases can have a best fit in each band, but only if the traditional assumption that  $\epsilon_3 = \epsilon_4 = 0.9$  is relaxed. It is known that some meteorite and mineral samples have laboratory spectra where  $\epsilon_3, \epsilon_4 \neq 0.9$ , but this is the first suggestion that it may apply to entire asteroids. Other explanations are also considered.