**Atmospheric
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Interactive
Comment

Interactive comment on "The potential of polarization measurements from space at mm and sub-mm wavelengths for determining cirrus cloud parameters" *by* J. Miao et al.

Anonymous Referee #2

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General comments:

This paper presents an interesting modeling study on polarized signals from cirrus when observed with mm and sub-mm wavelength radiometers. The study has provided some guidance and expectations for future observations and instrument designs. Some part of the paper and the assumptions used are not clearly described.

Specific comments:

section 3.3.1: What is your definition of the "random" case? Is that defined in Fig.5 caption? You should define it here. I guess that your "random" case is NOT truely random in 3 dimensions. Otherwise, in the truely 3D randomness, as well as for the

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perfect spherical particles, we expect Q=0, right?

How do you incorporate the randomly orientated particles into your radiative transfer calculation? In other words, what was the angular bins and size bins in calculating the ensemble-averaged phase function in Eq.10? I expect that the ensemble average include a size average and angular averages for each size bin.

After al, I don't understand physics behind the non-zero Q in Fig.2 and the infinity case in Fig.5-6. If you can provide meaningful explanation, it would be helpful for the reader with these details included.

Section 3.3.2: To my understanding, the resonance peaks are not really resonance. They are the manifestations of the convolution of scattering efficiency distribution and particle size distribution. This is obvious for small aspect ratios where particles are near spherical and your results are consist with the Mie calculation.

Interactive comment on Atmos. Chem. Phys. Discuss., 2, 1403, 2002.

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