

Review #4

PROPOSAL NO.: 0417929

INSTITUTION: U of Colorado Boulder

NSF PROGRAM: GEOPHYSICS

PRINCIPAL INVESTIGATOR: Ritzwoller, Michael H

TITLE: Collaborative Research: CMG: Uncertainty and Physical Constraints in Seismic Inferences

RATING: Good

REVIEW:

What is the intellectual merit of the proposed activity?

What are the broader impacts of the proposed activity?

Summary Statement

This CMG proposal suffers from many of the same defects as another I reviewed approximately one year ago. The sections obviously written by Mike Ritzwoller deal with practical issues regarding model uncertainty which are well-known to all seismic tomographers; the sections obviously written by Phil Stark suddenly begin to talk about separable Banach spaces. There does not appear to have been a great deal of communication between the PI's so far (I recognize that such communication is the intent of the proposal, and that it is unlikely to be fostered unless the proposal is funded). Another symptom of the lack of communication: on page 12 Stark's (1993) work on tubular tomography is discussed, with no mention that it has since been superseded (for surface waves) by the diffraction tomography developed by Ritzwoller and others. I am not familiar with Stark's recent work in cosmology and helioseismology, but it is noteworthy that the published COBE spectrum (which he has criticized in a 1999 "Inverse Problems" paper) is excellent agreement with the more recent WMAP results, on the quadrupole and slightly smaller angular scales where they are comparable. The imposition of so-called physical constraints into seismic inversions is a tricky business, as is hypothesis testing. In both instances, geophysical expertise is likely to be a far more critical ingredient for success (e.g., which hypothesis should be tested?) than mathematical expertise. I would give this a higher ranking if it were a purely disciplinary geophysics proposal from Ritzwoller.

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