Abstract Submitted
for the APR15 Meeting of
The American Physical Society

Detectability of cosmic dark flow in the type Ia supernova redshift-distance relation[1] GRANT MATHEWS, BENJAMIN ROSE, PETER GARNAVICH, U. Notre Dame, TOSHITAKA KAJINO, DAI YAMAZAKI, NAOJ — We re-analyze the possibility of large scale dark (bulk) flow with respect the the CMB background based upon the redshift-distance relation for Type Ia Supernovae (SN Ia). We have made a Markov chain Monte Carlo analysis using both the Union.2.1 and SDSS-II data sets. We also utilized simulated data with a bulk flow is imposed to determine whether the difficulty in detecting a bulk flow at high redshift is due to uncertainty in the redshift-distance relation, confusion with peculiar velocities, or the absence of a bulk flow. We find a bulk flow velocity of $v_{\rm bf} = 270 \pm 50$ km s^{-1} in the direction of galactic coordinates, $(l, b) = (295 \pm 30, 10 \pm 5)^\circ$, consistent with previous analyses. While in the redshift bin $z > 0.05$ we find only marginal evidence for a bulk flow velocity of $v_{\rm bf} = 1000 \pm 600$ km s^{-1} in the direction of galactic coordinates $(l, b) = (120 \pm 80, -5 \pm 30)^\circ$. However, we find that the SDSS-II supernova data set has insufficient sky coverage to provide a meaningful result. Based upon simulated data, the uncertainty at high redshifts arises mostly from large distance errors, however, detection might be possible with the next generation of large surveys like LSST.

[1]Work at the University of Notre Dame is supported by the U.S. Department of Energy under Nuclear Theory Grant DE-FG02-95-ER40934.

Grant Mathews
U. Notre Dame

Date submitted: 09 Jan 2015 Electronic form version 1.4