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Graham Denham and **Alexander I. Suciu*** (a.suciu@neu.edu), Department of Mathematics, Northeastern University, Boston, MA 02115. *Multinets, parallel connections, and Milnor fibrations of arrangements.*

The characteristic varieties of a space are the jump loci for homology with coefficients in rank 1 local systems. The way in which the geometry of these varieties may vary with the characteristic of the ground field is reflected in the homology of finite cyclic covers. We exploit this phenomenon to detect torsion in the homology of Milnor fibers of projective hypersurfaces. One tool we use is the interpretation of the degree 1 characteristic varieties of a hyperplane arrangement complement in terms of orbifold fibrations and multinets on the corresponding matroid. Another tool is a polarization construction, based on the parallel connection operad for matroids. Our main result gives a combinatorial machine for producing arrangements whose Milnor fibers have torsion in integral homology. In particular, this shows that Milnor fibers of hyperplane arrangements do not necessarily have a minimal cell structure. (Received February 09, 2013)