Abstract Submitted
for the APR05 Meeting of
The American Physical Society

Causal Sets, Hypergraphs and Cosmology JOSE L. BALDUZ JR., Mercer University — Causal sets are discrete structures consisting of points and causal links; they show great promise as the starting point for quantization of space-time and general relativity. A graph is a discrete set of nodes and connecting links. A hypergraph is a generalized graph, wherein every subset of the node set may be included as an edge, which is analogous to a (2-node) link. A fundamental correspondence is presented between causal sets and hypergraphs. This is used to define a time index for each causal set point, which well-orders the set, as well as a spatial distance between points, which obeys the triangle inequality. The complete hypergraph is considered as the prime example. The time and spatial measures provide local and global structure for the corresponding causal set, as well as a simple derivation of the Hubble Law.

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Date submitted: 13 Jan 2005 Electronic form version 1.4