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Chirality, Handedness and Pseudovectors THOMAS A. KAPLAN, Michigan State University, S. D. MAHANTI, Michigan State University, KYLE WARDLOW, Iowa State University — Chirality has been, to our knowledge, universally defined as a symmetry property, namely, lack of mirror symmetry of a physical object (e.g. a molecule) or, more generally, a physical situation (e.g. light propagation). It is understood that the mirror can be followed by a proper rotation and/or translation. The word chirality (Greek: hand), was added by Lord Kelvin after Pasteur noted the physical importance of right- and left-handed molecules, and, in this context, is considered identical to handedness. However, there is another context, equally important, where handedness has a different meaning, namely the handedness associated with the definition of the cross-product of two vectors. We call the former def. 1, the latter, def. 2. We show that the two meanings are essentially different by giving examples which are simultaneously handed (def. 2) and not chiral. These are drawn from light waves, spin spirals and multiferroics. Thus we show that there must be a distinction between chirality and the general idea of handedness.

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