

Abstract Submitted
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A new order parameter in complex dipolar structures SERGEY PROSANDEEV, LAURENT BELLAICHE, University of Arkansas — Microscopic models have been used to reveal the existence of a new order parameter that is associated with many complex dipolar structures in magnets and ferroelectrics. This overlooked order parameter involves a double cross product of the local dipoles with their positions. It provides a measure of subtle microscopic features, such as the helicity of the two domains inherent to onion states, curvature of the dipolar pattern in flower states or characteristics of set of vortices with opposite chirality (e.g., distance between vortices' centers and/or magnitude of their local dipoles). This work is mostly supported by DOE grant DE-FG02-05ER46188. We also acknowledge support from ONR grant N00014-04-1-0413 and NSF grants DMR-0701558, DMR-0404335 and DMR-0080054 (C-SPIN). Some computations were made possible thanks to the MRI Grants 0421099 and 0722625 from NSF.

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