Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Topological character and chiral solitons in double Peierls-distorted chains SANGMO CHEON, TAE-HWAN KIM, SUNG-HOON LEE, HAN WOONG YEOM, CALDES, Institute for Basic Science and POSTECH, Korea — Chiral edge states have played an important role in understanding condensed matter systems such as quantum Hall systems and topological insulators. In 1D electronic systems, Peierls-distorted atomic chains such as polyacetylene have two topologically different ground states and thus have topological edge states between them. The edge states—topological solitons—show novel properties of charge-spin separation and fractional charge. Here, we present theoretical results on the topological properties of double Peierls-distorted chains with interchain coupling. The double Peierls chains support a dynamically generated topological structure with four-fold symmetric ground states and have topological solitons with a new degree of freedom, chirality, which is absent in a single chain. We also discuss experimental evidence of the chiral solitons in the 1D charge-density wave (CDW) system of indium atomic nanowires on silicon substrates.

Sangmo Cheon
CALDES, Institute for Basic Science and POSTECH

Date submitted: 14 Nov 2014 Electronic form version 1.4