

Chern-Simons Decomposition of 3D Gauge Theories at Large Distances

Tuna Yıldırım

ABSTRACT:

Using geometric quantization, 3D pure Yang-Mills theory and topologically massive Yang-Mills theory will be shown to exhibit a Chern-Simons splitting behavior at large scales, analogous to Chern-Simons decomposition of the topologically massive AdS gravity model. This large scale behavior allows one to use knot theory to calculate Wilson loop expectation values at large distances. The results provide insight on 3D gauge theories and may have applications in some condensed matter problems such as topological insulators or topological defects.