

Abstract Submitted
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A local characterization of the insulating state RAFFAELE RESTA,
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lation of Materials (THEOS) and National Centre for Computational Design and
Discovery of Novel Materials (MARVEL), EPFL, Switzerland — An insulator differs
from a metal because of a different organization of the electrons in their ground state.
This feature can be probed by means of the quantum metric tensor: a geometrical
property, inspired by—and closely related to—the modern theory of polarization.
Such tensor addresses the system as a whole, and it is therefore limited to macro-
scopically homogeneous samples. Here we show that the same approach leads to
a local marker, which can detect the metallic vs. insulating character of a given
sample region using as sole ingredient the ground state many-body wavefunction.
Simulations on paradigmatic systems validate our theory.

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