Quirks of QCD: Twist-2 Operators on the Lattice TANGEREEN
CLARINGBOLD, CHRIS MONAHAN, William Mary — To probe the structure of
hadrons, we often use high energy electrons in scattering experiments, called Deep
Inelastic Scattering or DIS. When doing theoretical calculations of the scattering
cross section of a DIS process, we apply the operator product expansion to introduce
the rotationally-invariant twist-2 operators, where twist is dimension minus spin. To
move to numerical calculations, we break up space and time into discrete points on
a lattice, rather than a continuum, which breaks rotational symmetry leading to the
twist-2 operators having power-divergent mixing under renormalization. We propose
that applying the gradient flow prescription to these operators on the lattice will
remove the power-divergent mixing. The gradient flow is a regulator that smears
the fields in a new parameter called the flow time. We give an example of two
twist-2 operators that have a power-divergent mixing on the lattice, but where this
power-divergence is removed under the gradient flow.

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