# Extending the kappa formalism to distributions is not a good idea

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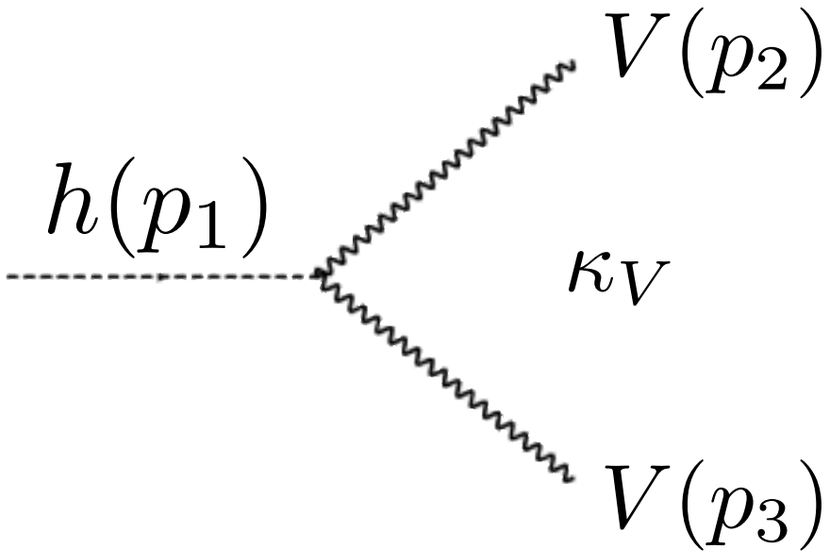
One could think on extending the kappa formalism to distributions by, for example, dealing with

$$h\,V\,V$$




going from describing total rates with a constant kappa

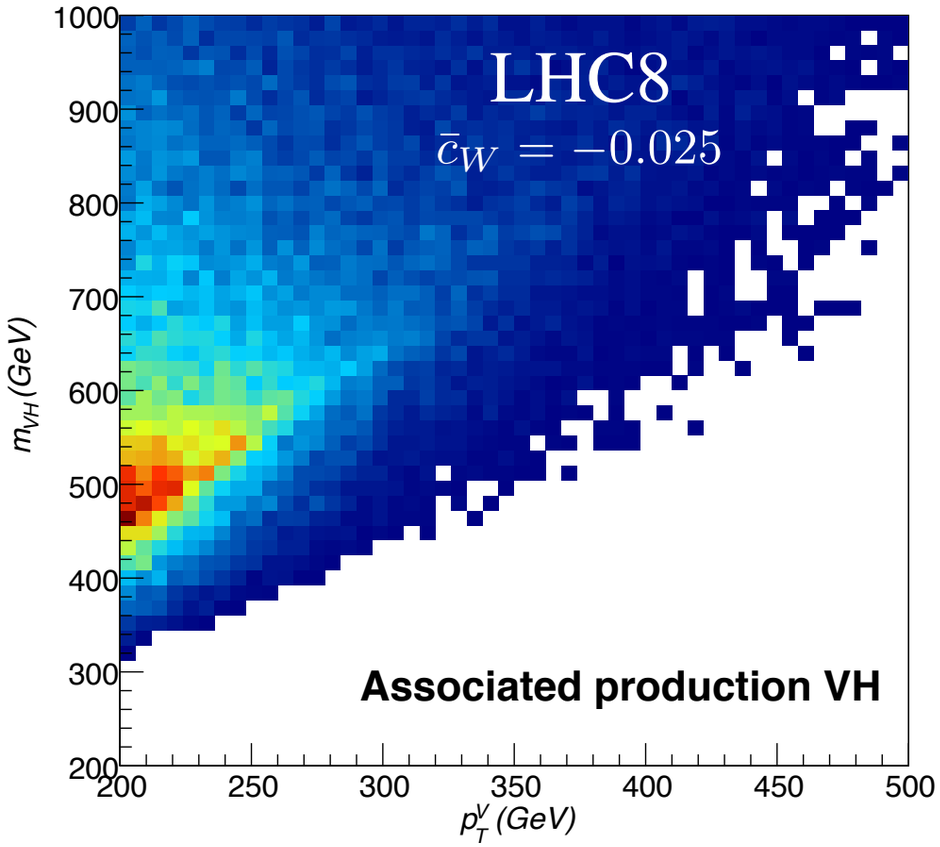
to the modifications that new physics would produce in kinematic distributions

For example, in associated production

invariant mass, mT,
pTV distributions

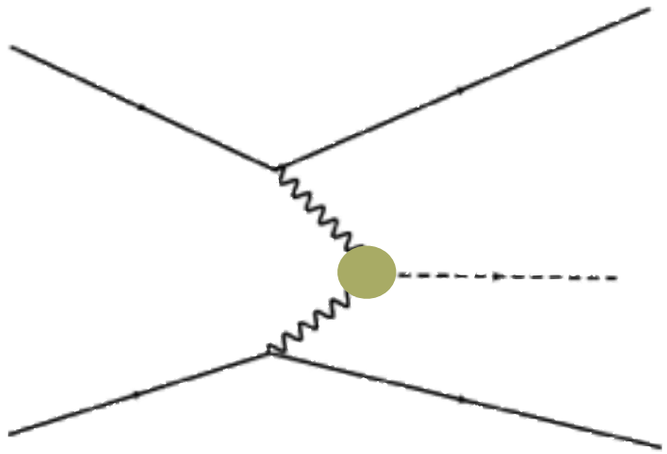
gauge-invariance?

$\kappa_V(m_{VH})$




$\kappa_V(p_T^V)$

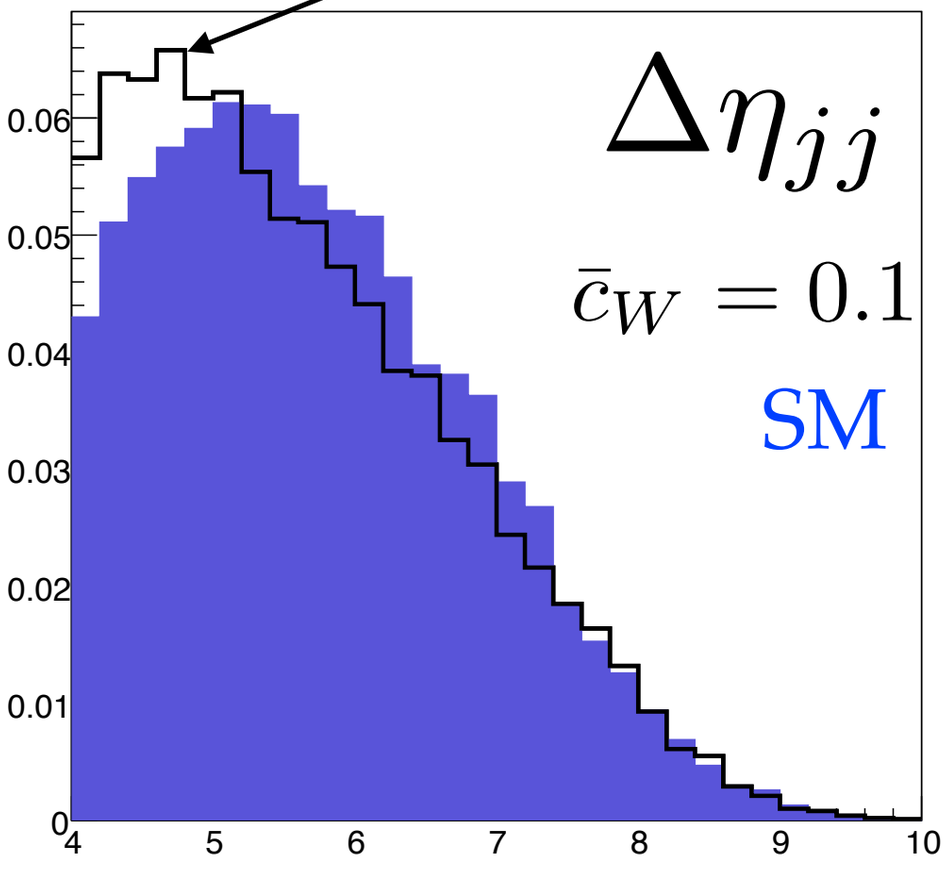
Or in VBF



NEW PHYSICS

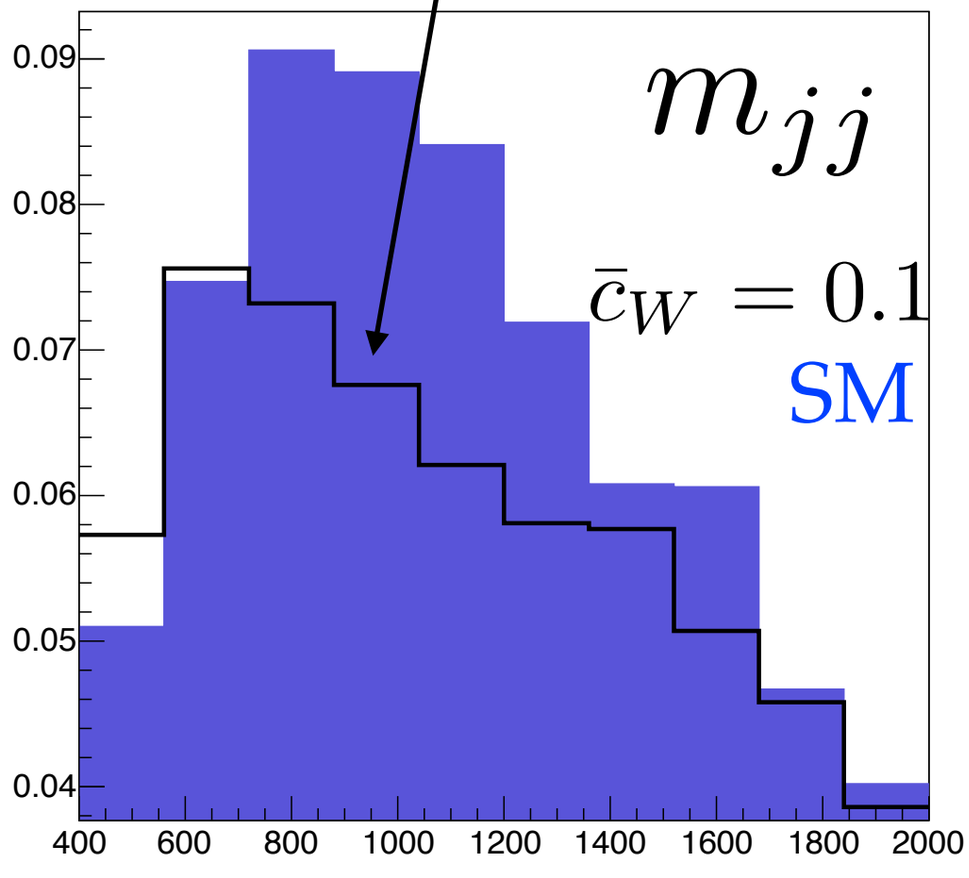
$\kappa_V(\Delta y_{jj})$

LHC13




$\kappa_V(m_{jj})$

LHC13



Epicycles

More distributions, more kappas
gauge invariance?
*total mess* when EW corrections are included

Instead (I think) one should do an analysis of
Higgs anomalous couplings
(gauge invariance manifest)
*and* a re-interpretation in terms of
Effective Field Theories
(connection with heavy new physics)

or in terms of amplitudes (=more epicycles)

# Translation between EFT and Anomalous couplings

## CP conserving anomalous couplings

$hZZ$
$hW^+W^-$
$h\gamma\gamma$
$h\gamma Z$
$TGCs$

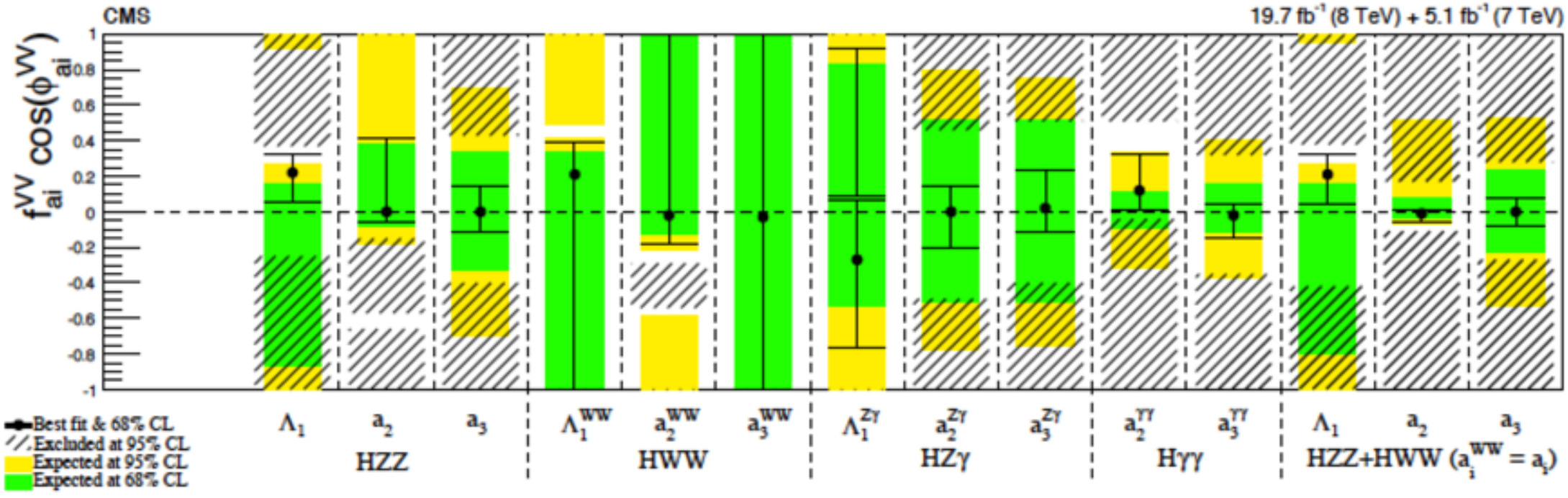
**13 couplings**

**EFT (Higgs doublet)**

**7 operators -**
**2 LEP constraints =**
**5 coefficients**

And many, many more in the proposed kappa formalism

# HACs can be re-interpreted as EFTs




9 HAC= 4 EFT operators

and since we care about differential distributions,
and the limitations of the EFT
a sanity check should be done in terms of
**benchmark models**