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Tevatron Top A_FB Versus LHC Top Physics

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We carry out a comprehensive analysis of models for top A_{FB} at the Tevatron in light of new top data arriving from the LHC. We begin with a careful Tevatron analysis, considering in general which sets of effective vertices give rise to a large forward-backward asymmetry while suppressing the contribution to the total $t\bar{t}$ cross-section. We show on general grounds that scalar models struggle to produce sufficient asymmetries, while vector models can produce a large asymmetry with a less significant tension in the total cross-section and $t\bar{t}$ invariant mass distribution at the Tevatron. We examine the essential observables of these models for top physics at LHC7 with 1 fb^{-1} of data, including the total cross-section, invariant mass distribution and number of additional jets in $t\bar{t}$ events. In the case of t -channel mediators, the LHC total cross-section places a strong constraint on light mediators, while the Tevatron invariant mass distributions place strong constraints on heavy mediators that are able to produce the asymmetry. Vanilla t -channel models thus seem disfavored at present. Heavy axigluons are becoming increasingly squeezed by LHC7 $t\bar{t}$ and dijet resonance searches. We conclude that LHC7 top analyses are rapidly closing the window for viable models of Tevatron A_{FB} .

Presenter: Dr KIM, Ian-Woo (University of Michigan)

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