SEARCH FOR INVISIBLE DECAY MODES OF THE HIGGS BOSON WITH THE ATLAS DETECTOR

HIGGS INVISIBLE DECAY SEARCHES: WHY?

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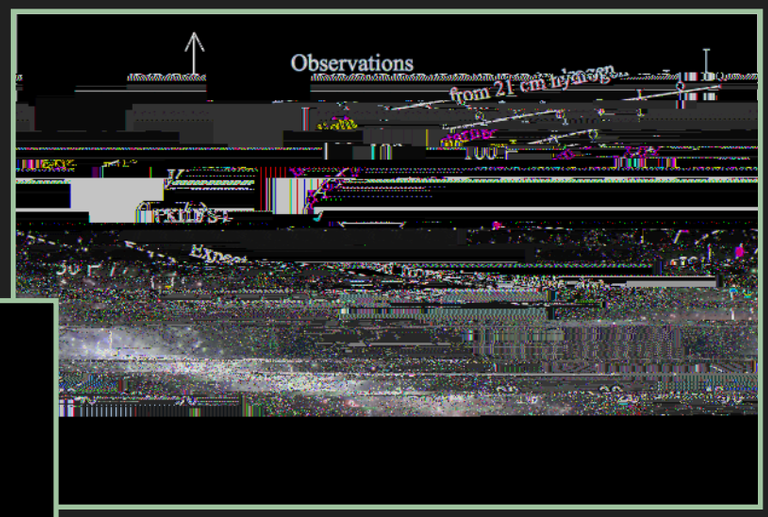
1.

2.

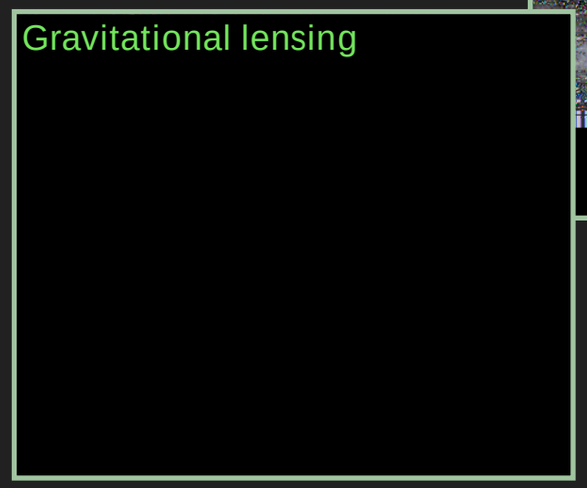
3. Dark Matter

4. ...

→ Need to go beyond the SM



Galaxies rotation curve



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MONO-JET SEARCH

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Event Selection

Backgrounds estimation

Results

VBF CHANNEL

Results

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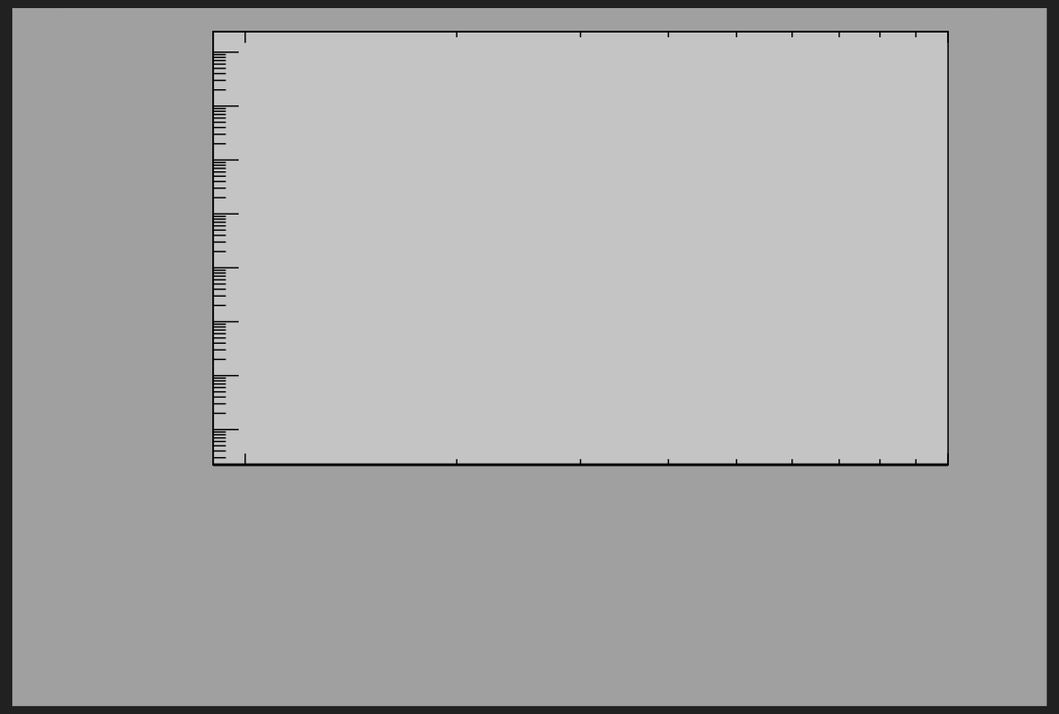

No significant excess observed over SM predictions

95% CL limits results	Run-II result Obs. Exp.	Run-I result Obs. Exp.
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$! ## % !		

8 TEV COMBINATION OF THE DIRECT SEARCHES

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Run-I only

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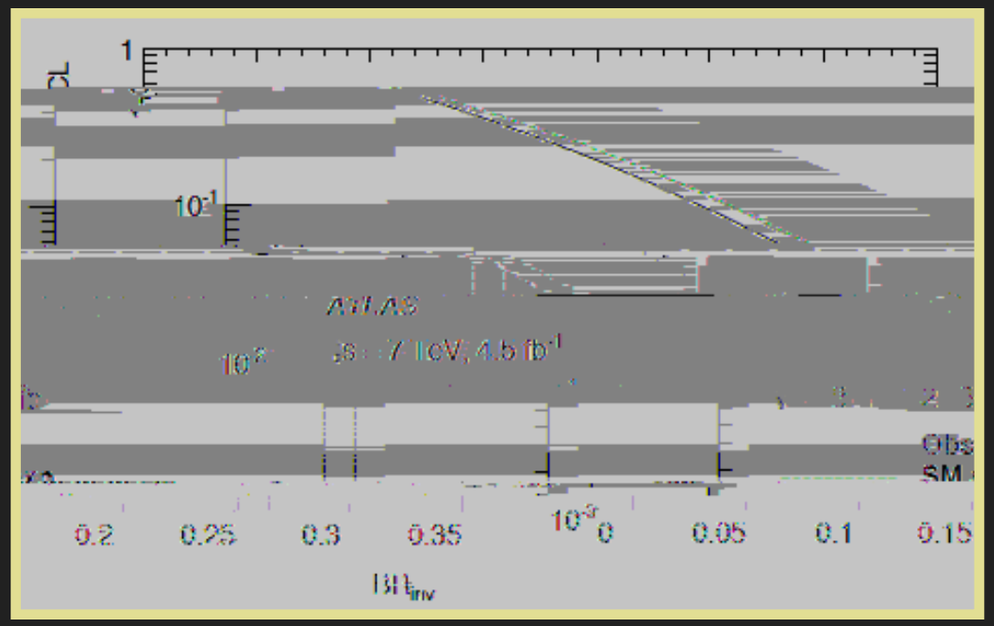

INDIRECT CONSTRAINT ON H ! INVISIBLE

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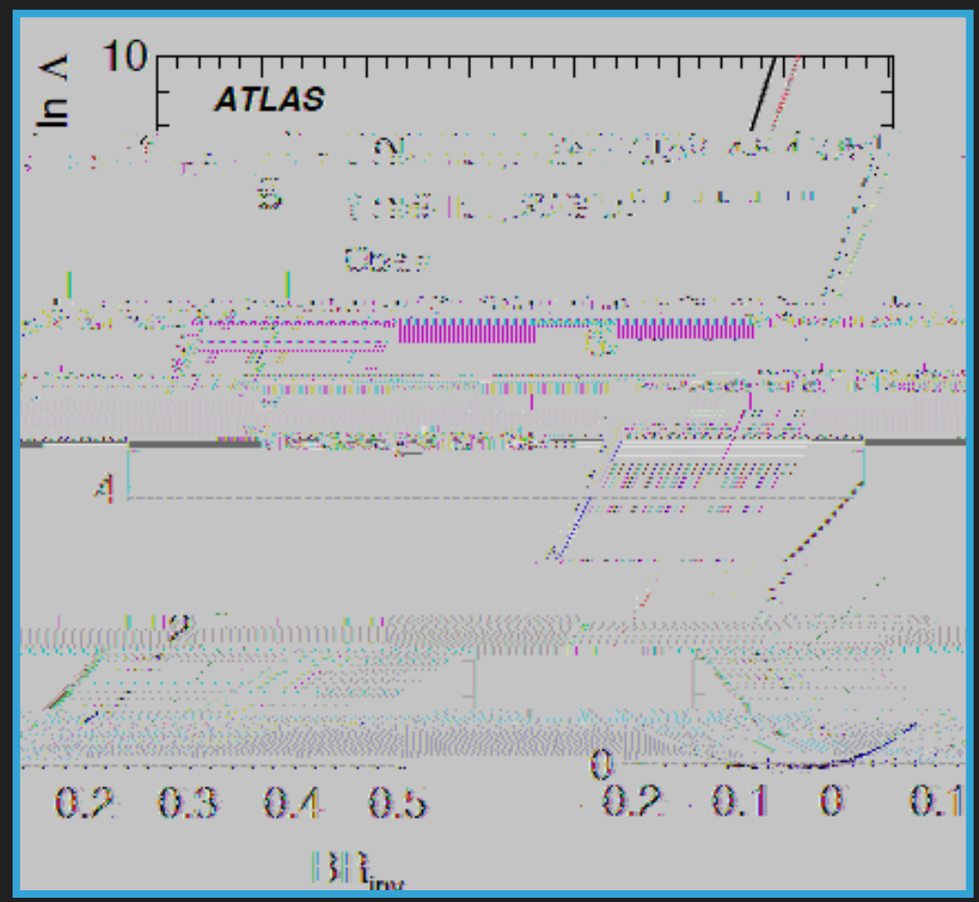
$$k_h = !_h \quad !_{h\,SM} = \sum_j k_j\, BR_j \qquad \# BR_{inv}$$



INTERPRETATIONS

SUMMARY OF H ! INVISIBLE SEARCHES

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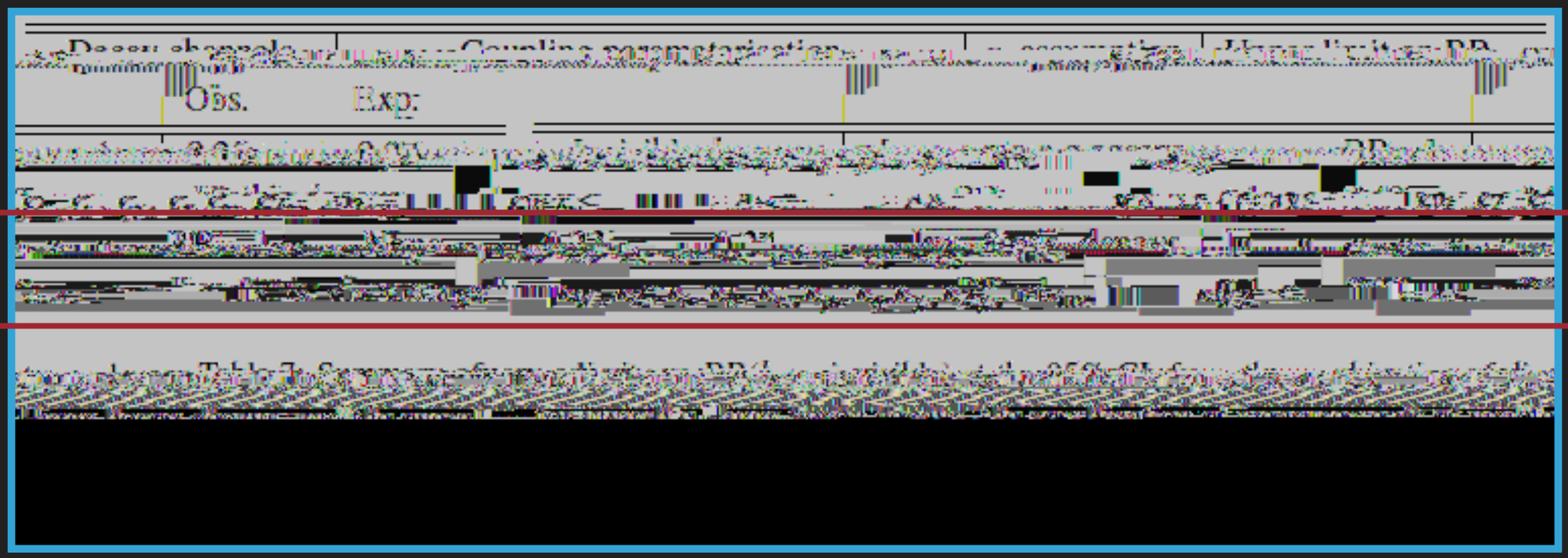

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BACKUP

GENERAL METHODOLOGIES FOR BACKGROUNDS

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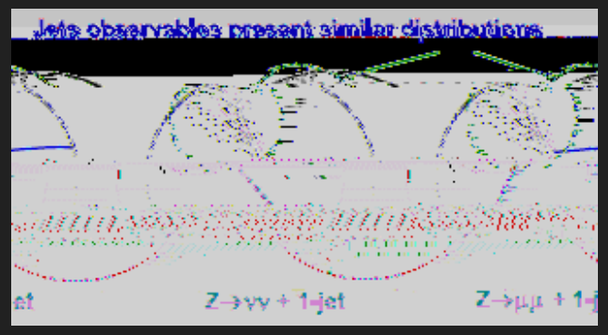

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GENERAL METHODOLOGIES FOR BACKGROUNDS

Non-collision background

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HIGGS PORTAL DARK-MATTER MODEL