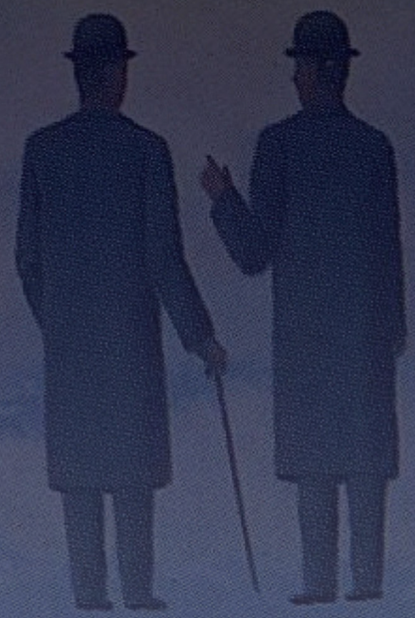
CERN
Theory Group Retreat 2016

Alfredo Urbano



About Me

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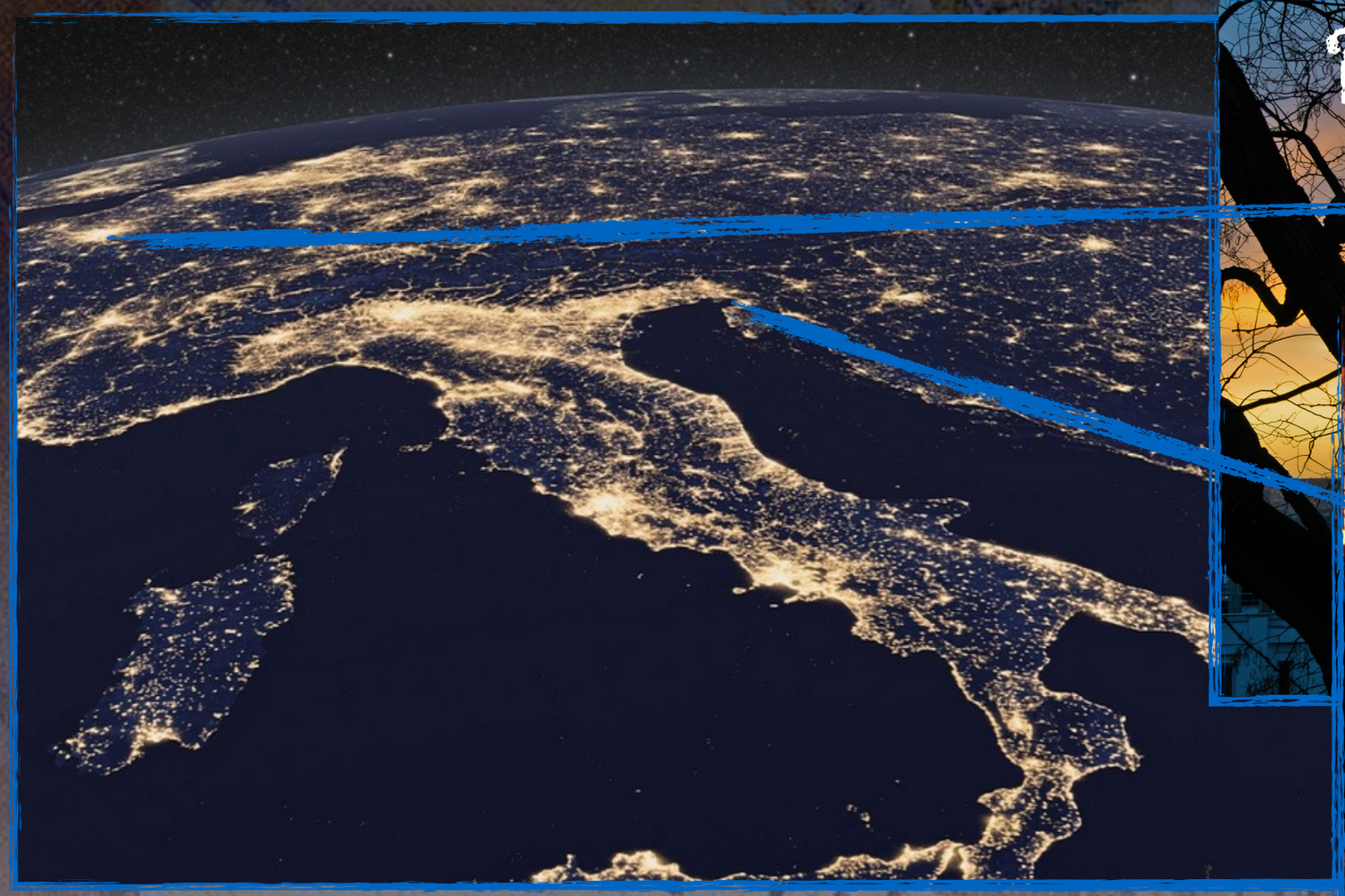


About my research

About my research

BSM

About my research

LHC

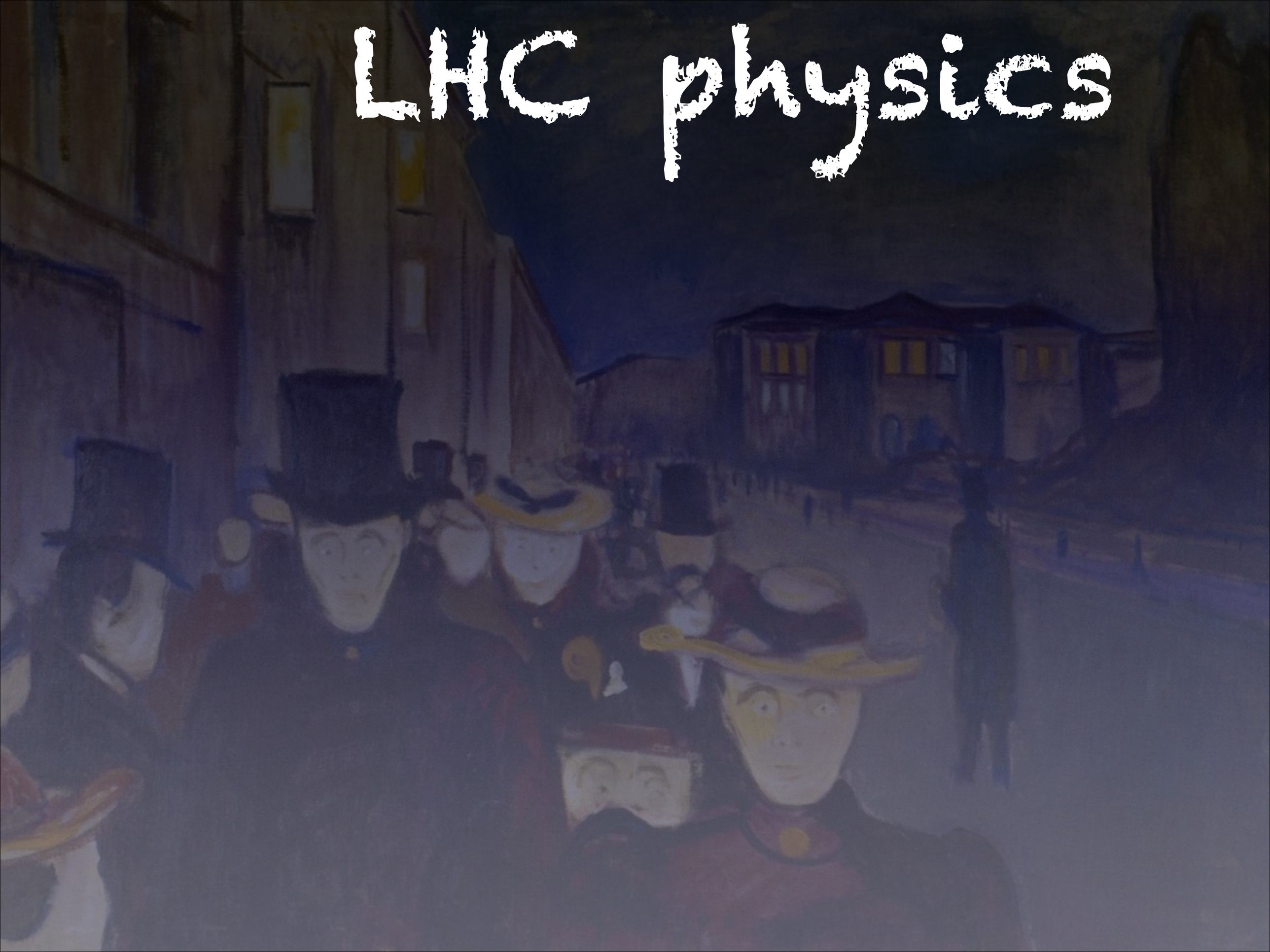
DM

Dynamics of EWSB

BSM

BSM & GR

LHC physics



LHC physics

1) M. Son, AU, "A new scalar resonance at 750 GeV: Towards a proof of concept in favor of strongly interacting theories", JHEP 1605 (2016) 181

2) M. Fabbrichesi, AU, "750 GeV resonance at the LHC and perturbative unitarity", Phys.Rev. D94 (2016) no.3, 035004

3) A. Salvio, F. Staub, A. Strumia, AU, "On the maximal diphoton width", JHEP 1603 (2016) 214

4) F. Goertz, A. Katz, M. Son, AU, "Precision Drell-Yan Measurements at the LHC and Implications for the Diphoton Excess", JHEP 1607 (2016) 136

5) M. Fabbrichesi, M. Pinamonti, AU, "Telling the spin of the di-photon resonance", arXiv:1604.06948

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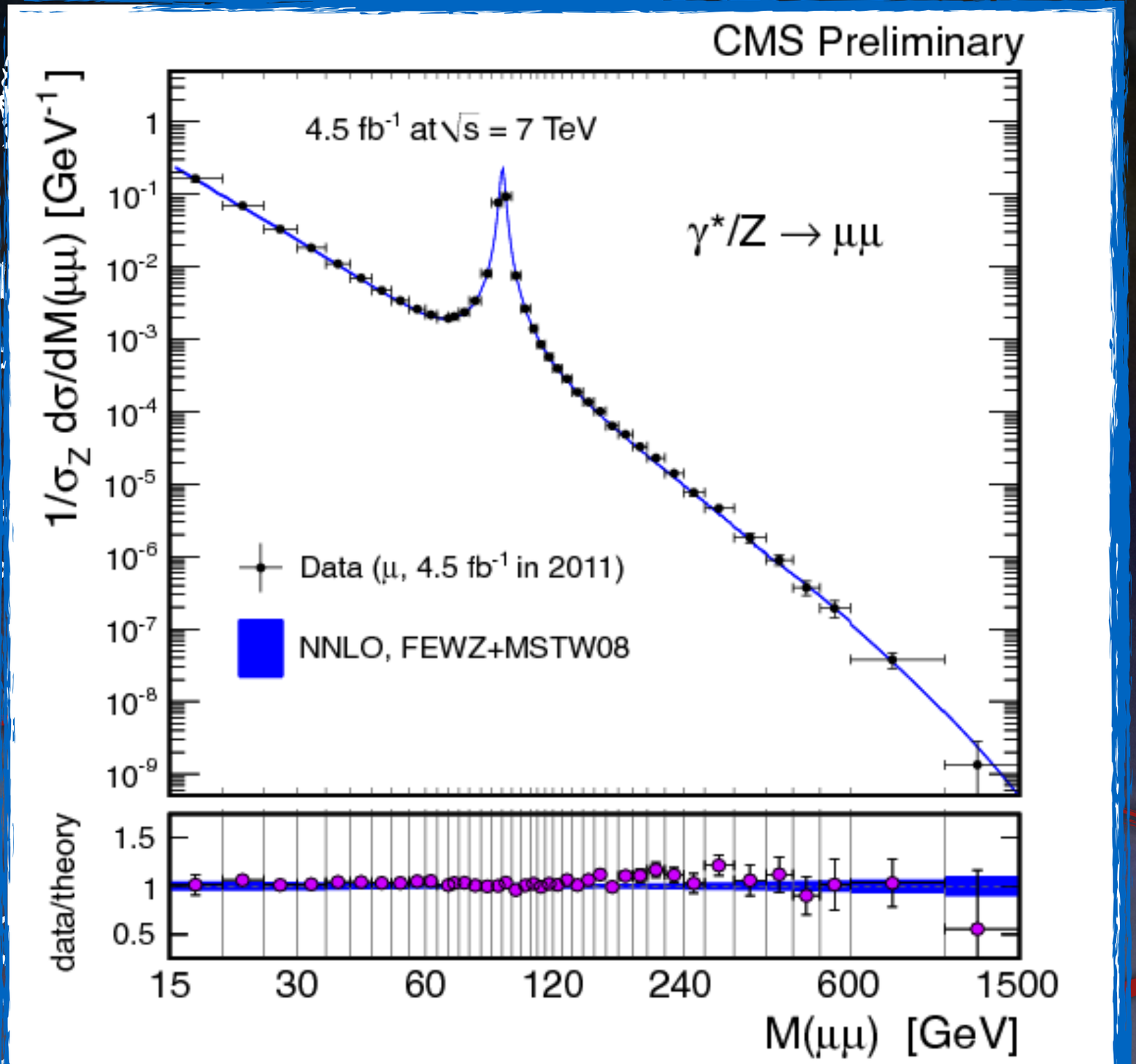

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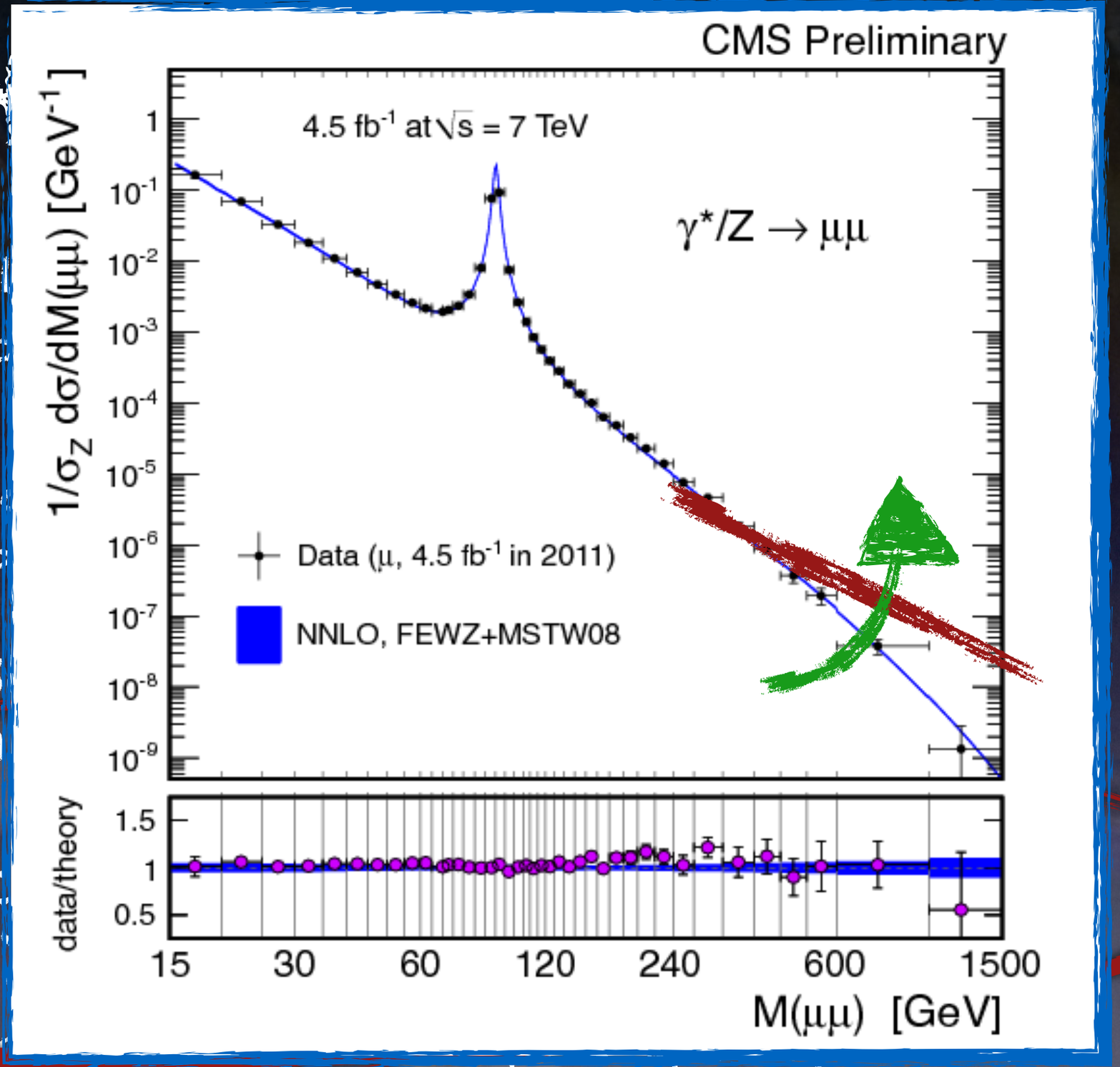

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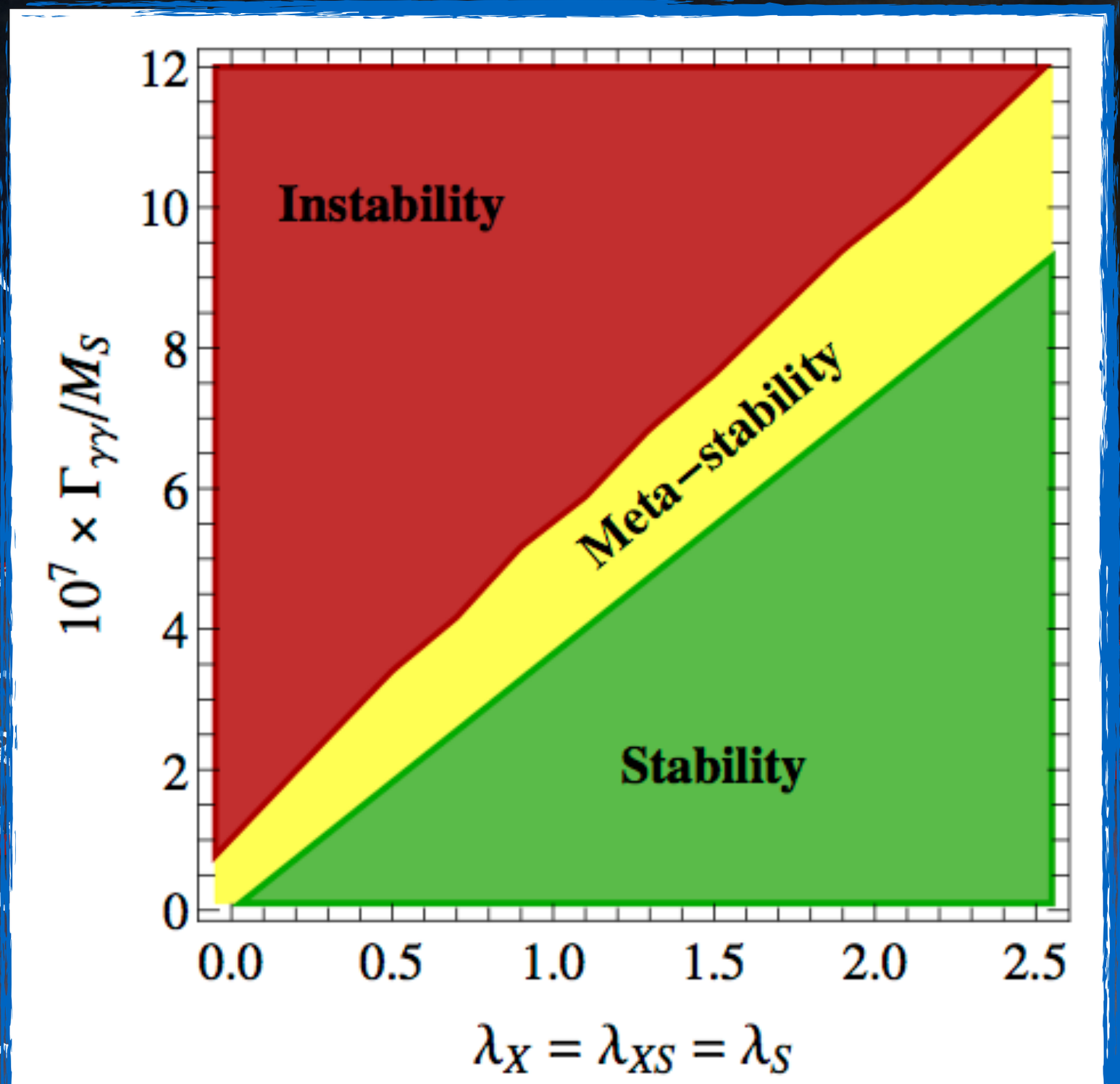
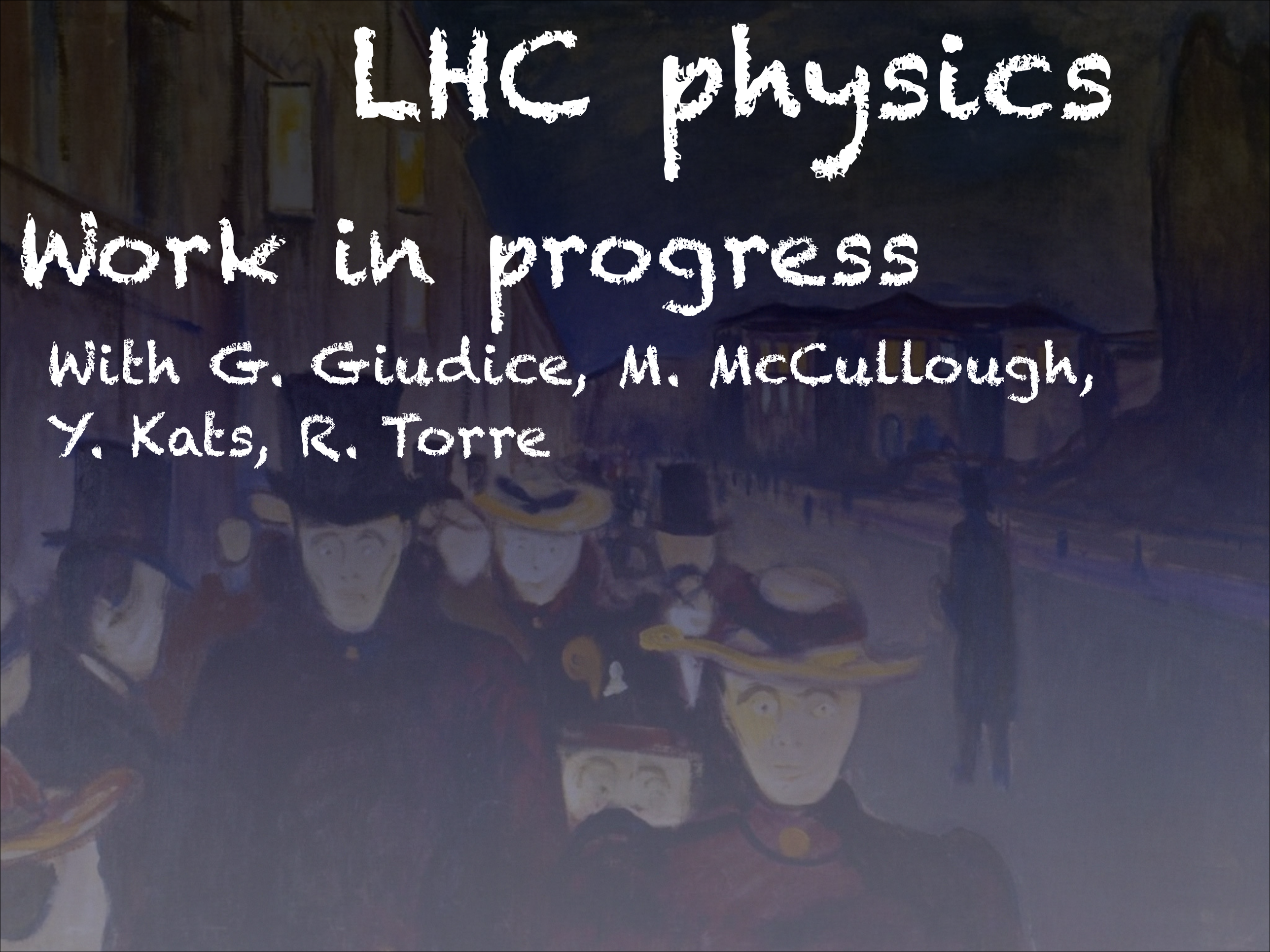


LHC physics

Work in progress

With G. Giudice, M. McCullough,
Y. Kats, R. Torre



LHC

Work in p

With G. Giudic

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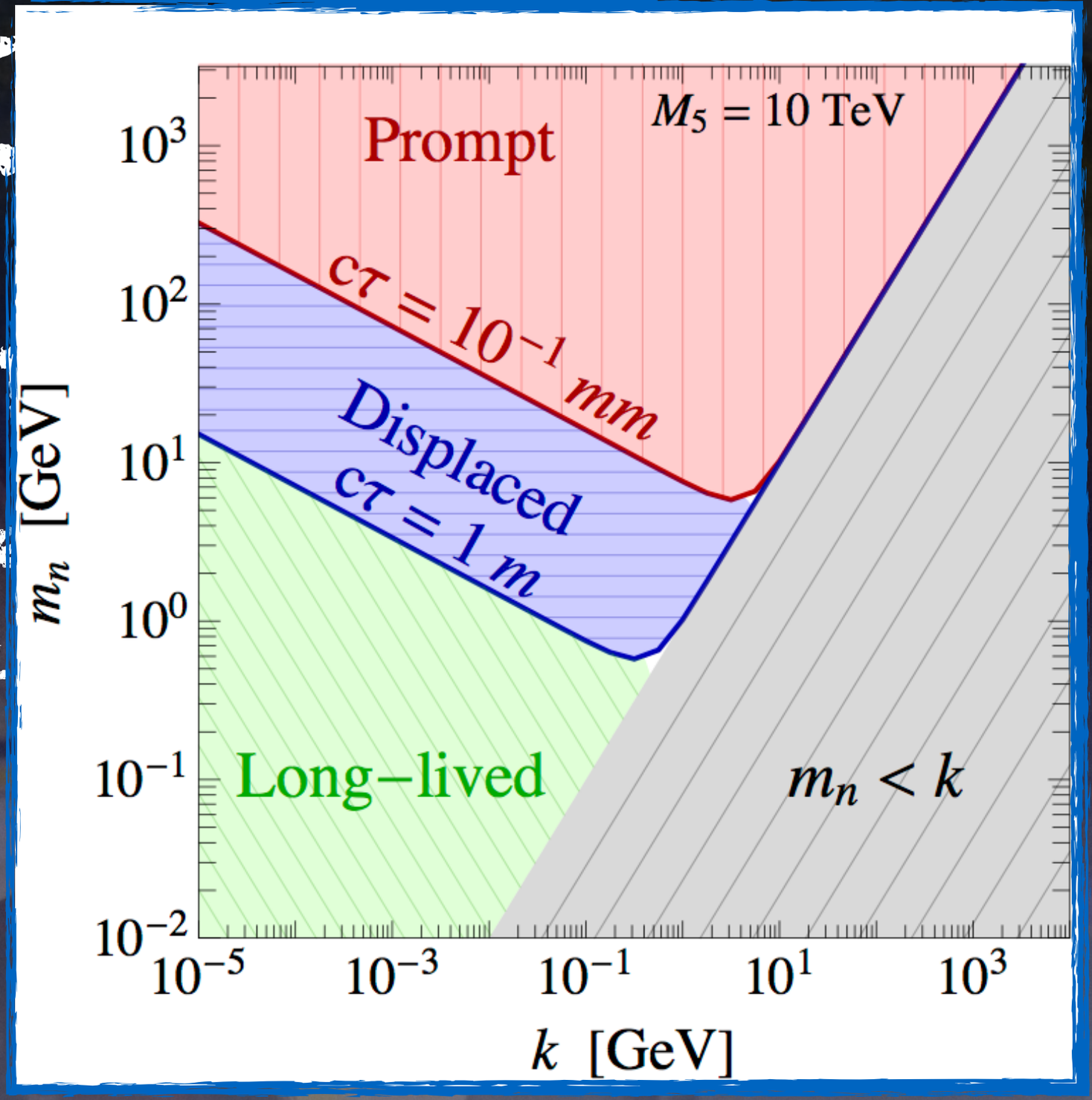

Dark matter

Dark matter

1) S. Bruggisser, F. Riva, AU,
"The Last Gasp of Dark Matter Effective Theory", JHEP 1605 (2016) 181

2) S. Bruggisser, F. Riva, AU,
"Strongly Interacting Light Dark Matter",
arXiv:1607.02474

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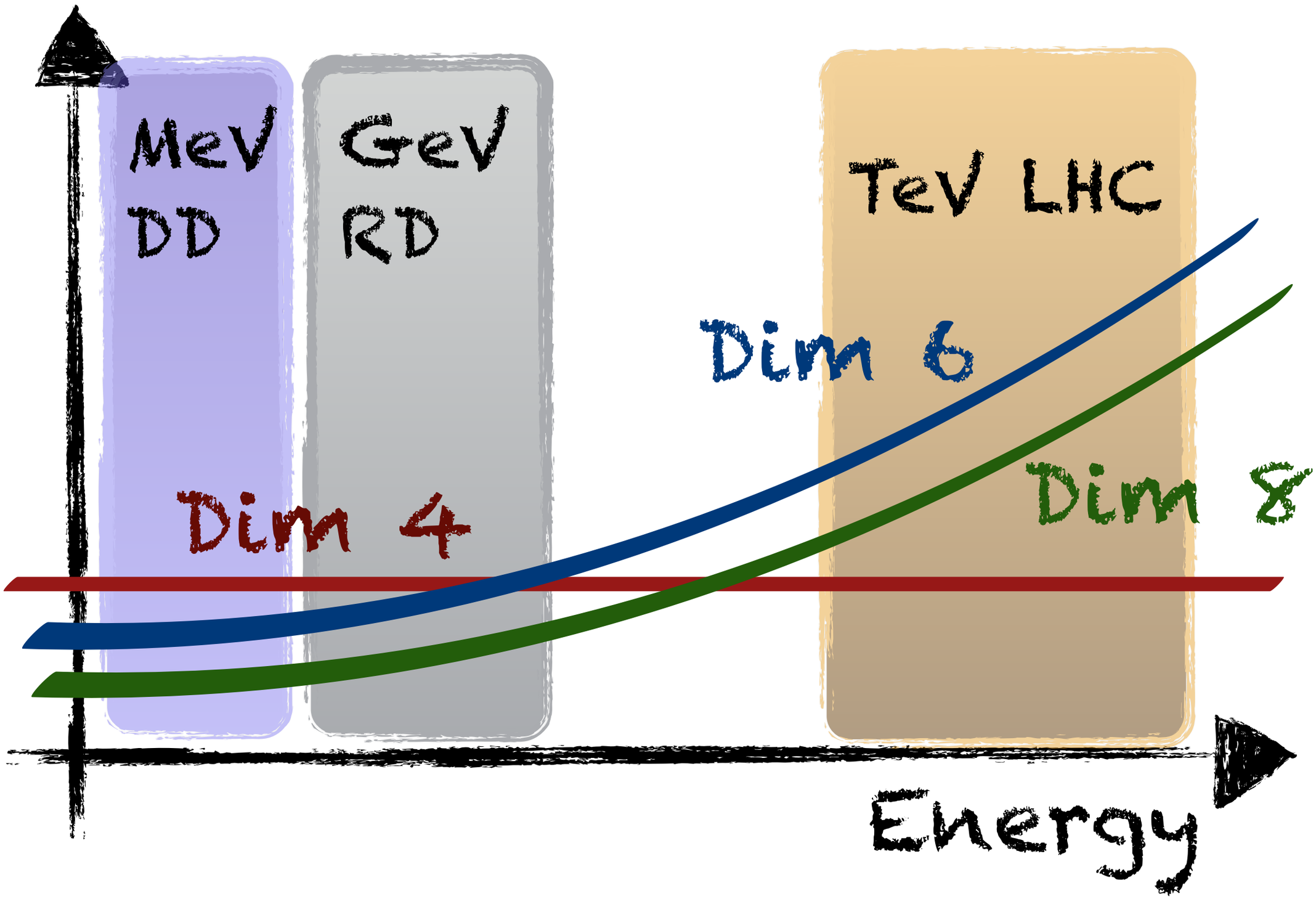


Work in progress
Dark matter

Light dark matter

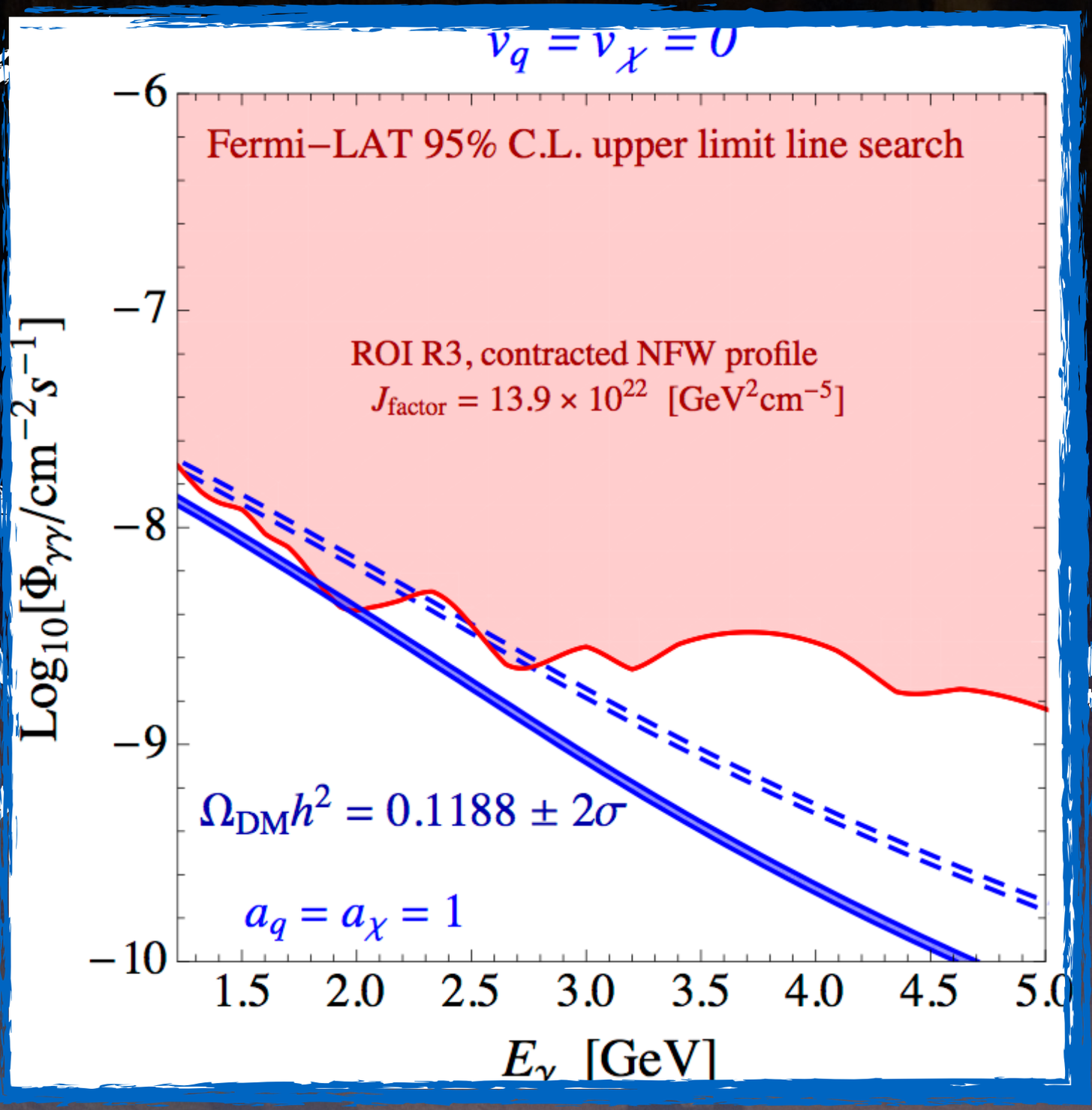
If dark matter mass few GeV

Work in progress
Dark matter

Light dark matter

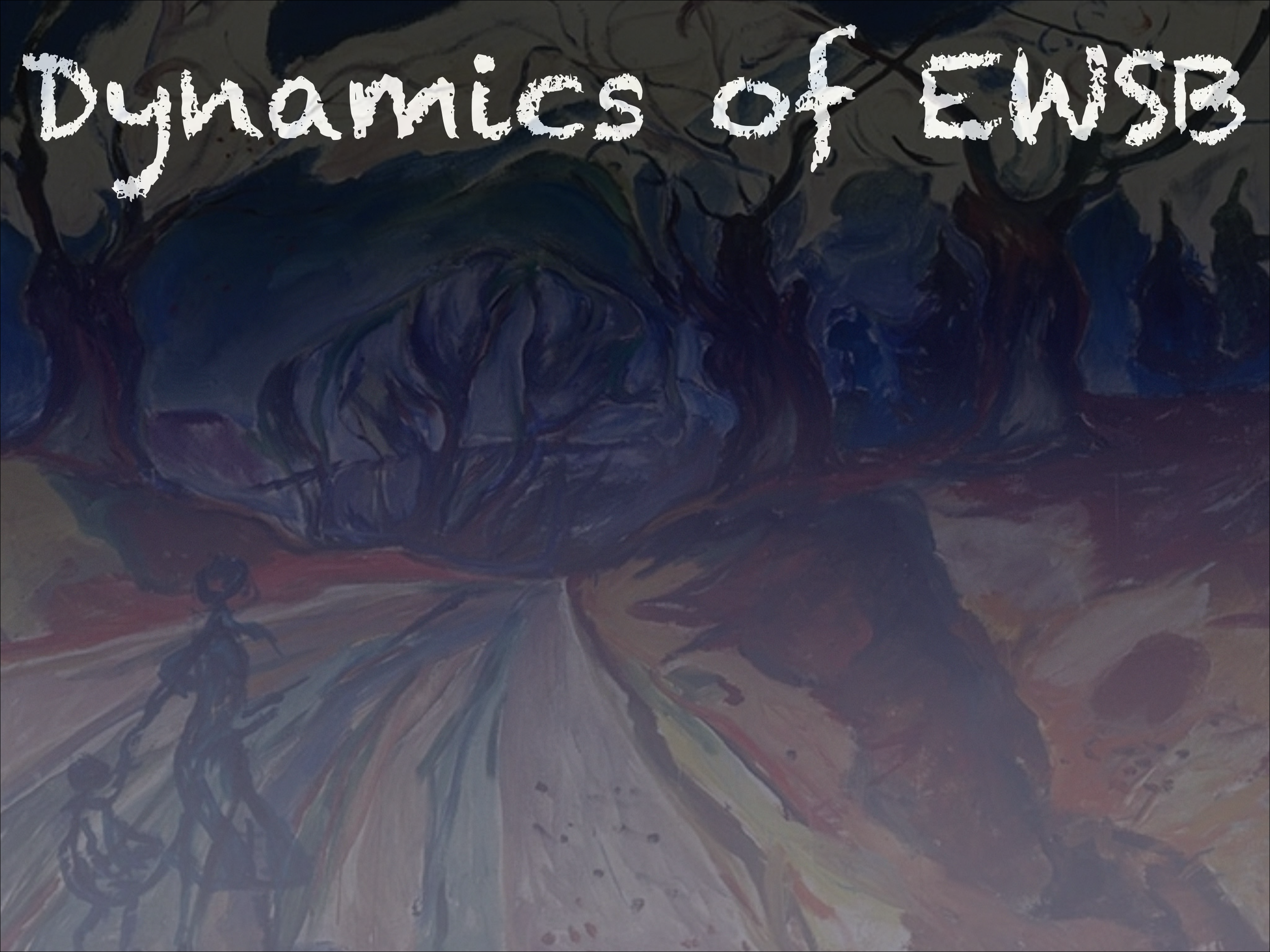
If dark matter mass few GeV

Dark m



With M. McCullough

Dynamics of EWSB



Dynamics of EWSB

1) A. Salvio, A. Strumia, N. Tetradis, AU,
"On gravitational and thermal corrections to vacuum decay", JHEP 1609 (2016) 054

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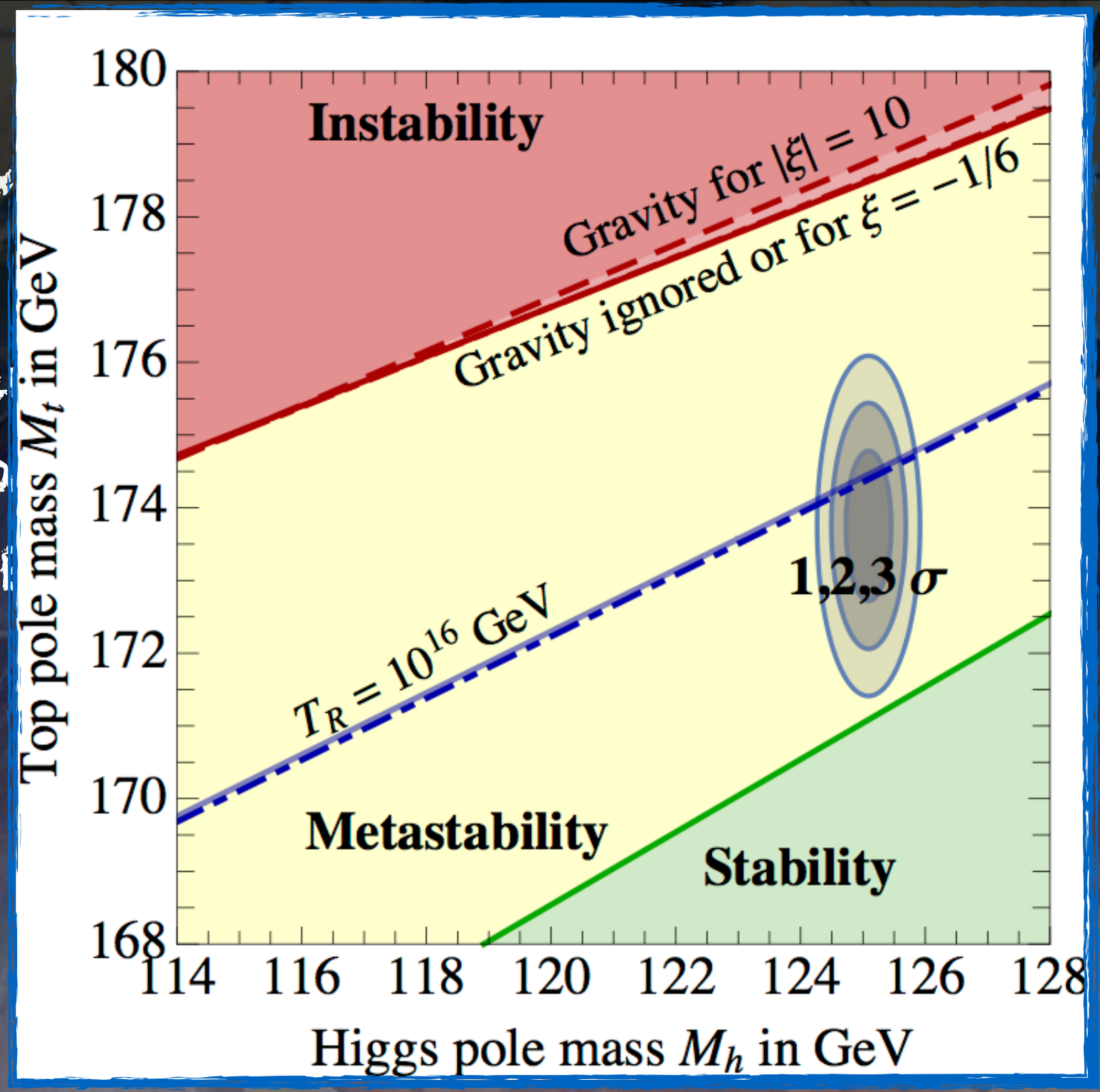
"On gravitational o
vacuum decay", JHI



Dynamics of EWSB

Work in progress

With A. Salvio, A. Strumia, N. Tetradis

Dynamics of EWSB

Work in progress

With A. Salvio, A. Strumia, N. Tetradis

BSM and GR

BSM and GR

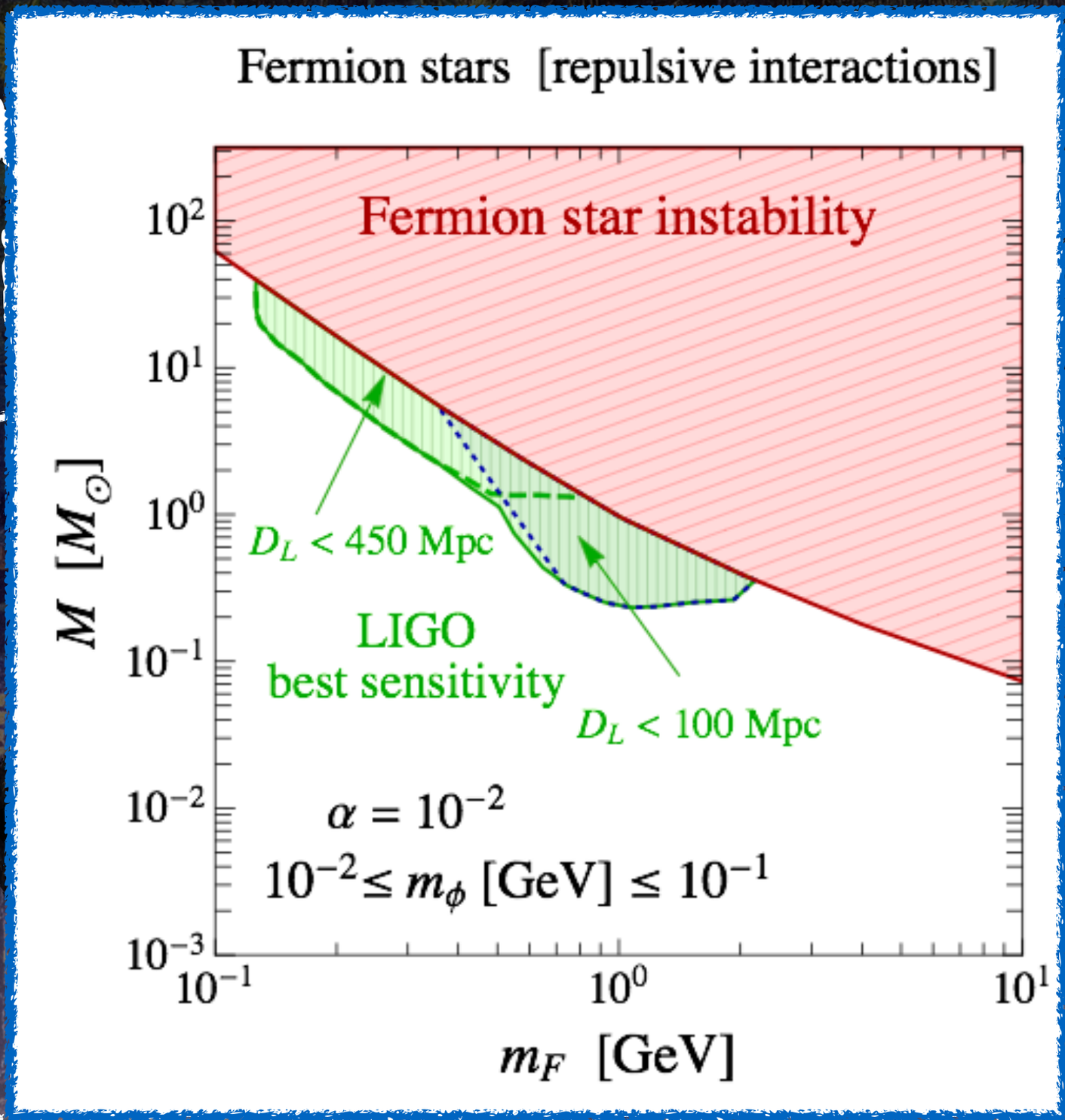
1) G. F. Giudice, M. McCullough, AU, "Hunting for Dark Particles with Gravitational Waves", JCAP 1610 (2016) no. 10, 001

BSM and GR
What can aLIGO detect ?

The GW signal emitted in the merger of compact objects with mass in the range of 10's solar masses and compactness comparable to a black hole

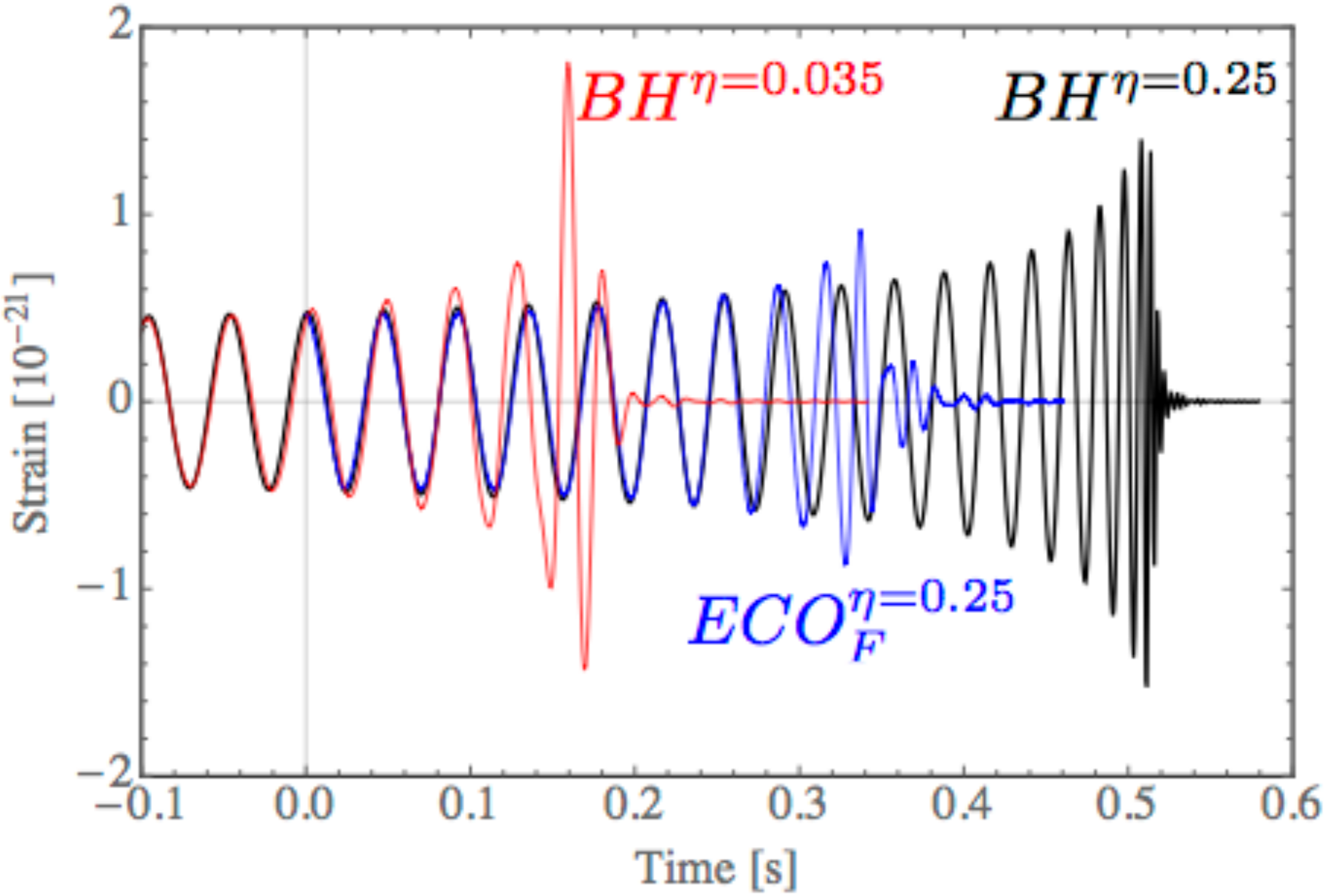
BSM o

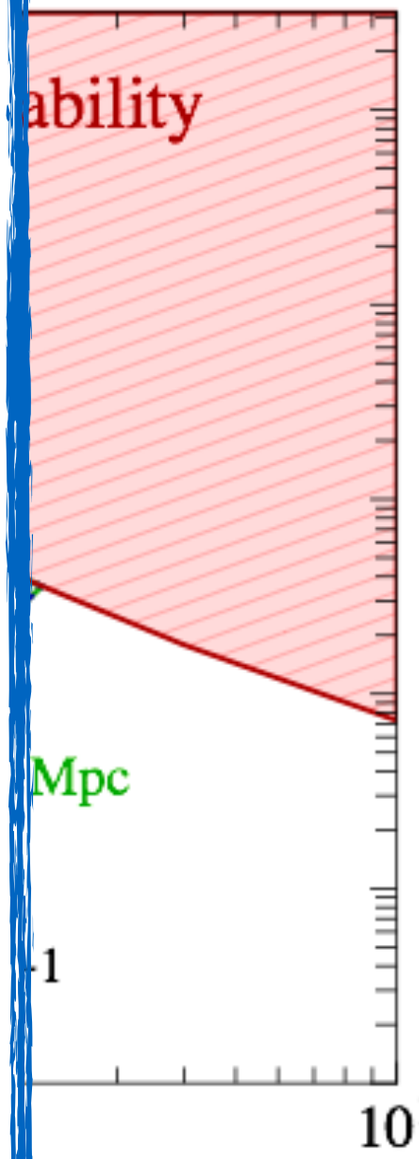
What can a



compactness comparable to a black hole

Fermion stars [repulsive interactions]





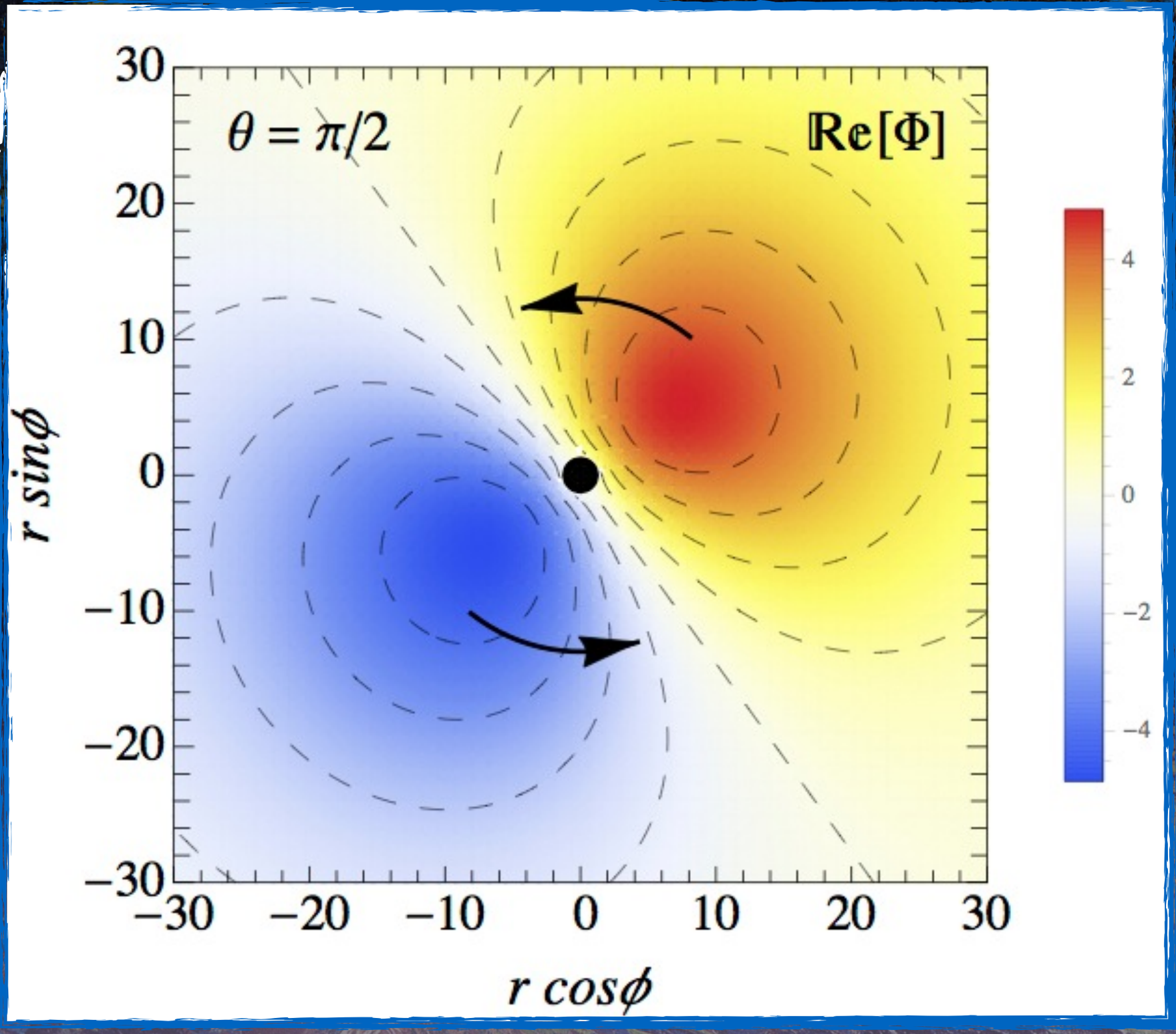
compactness comparable to a black hole

BSM and GR

Work in progress

With D. Blas, S. Sibiryakov

BS
Work i
With D.



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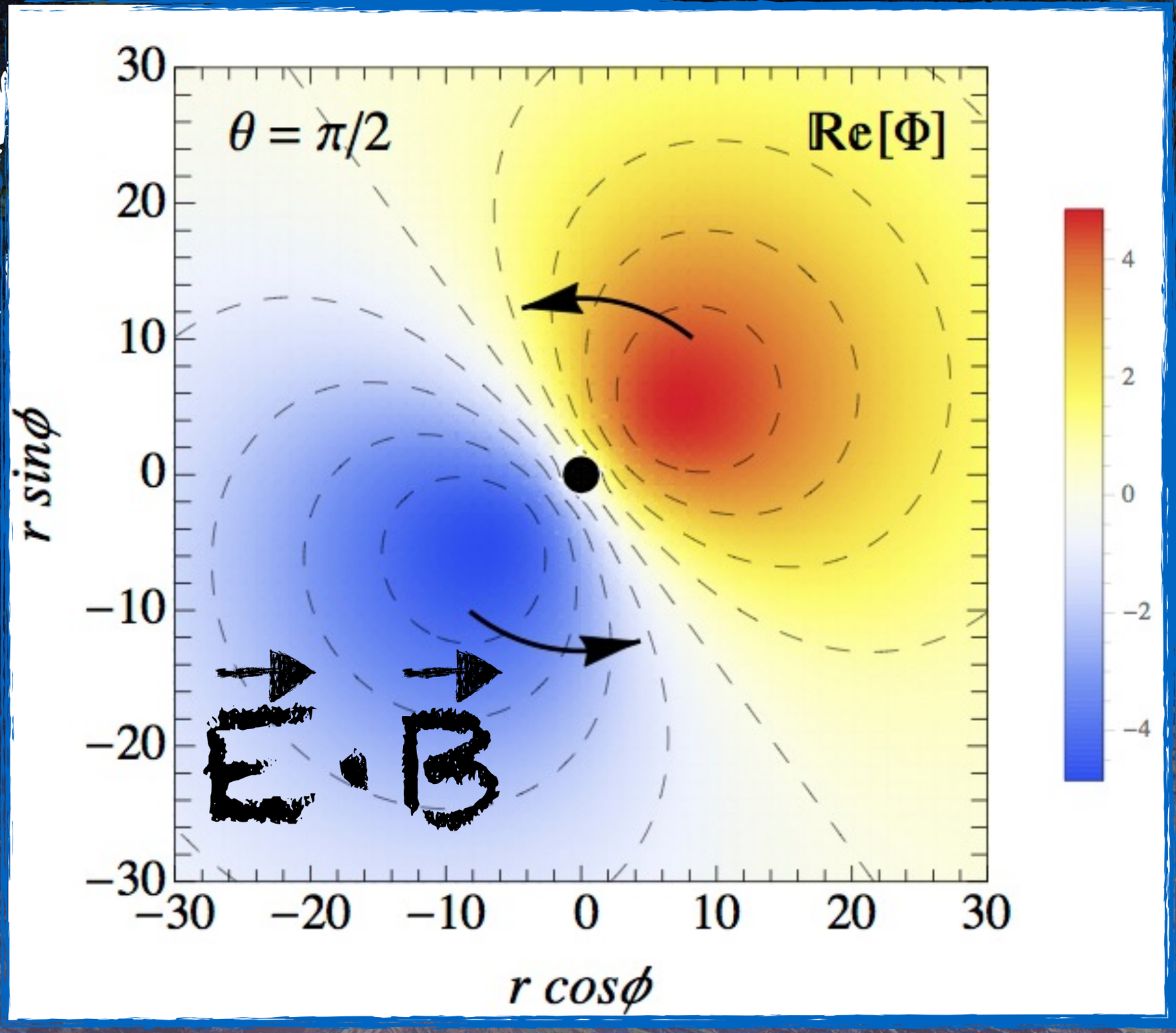
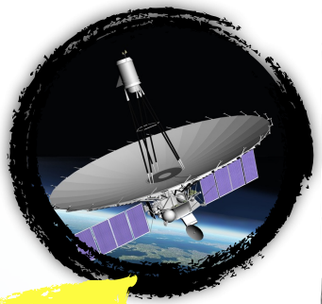


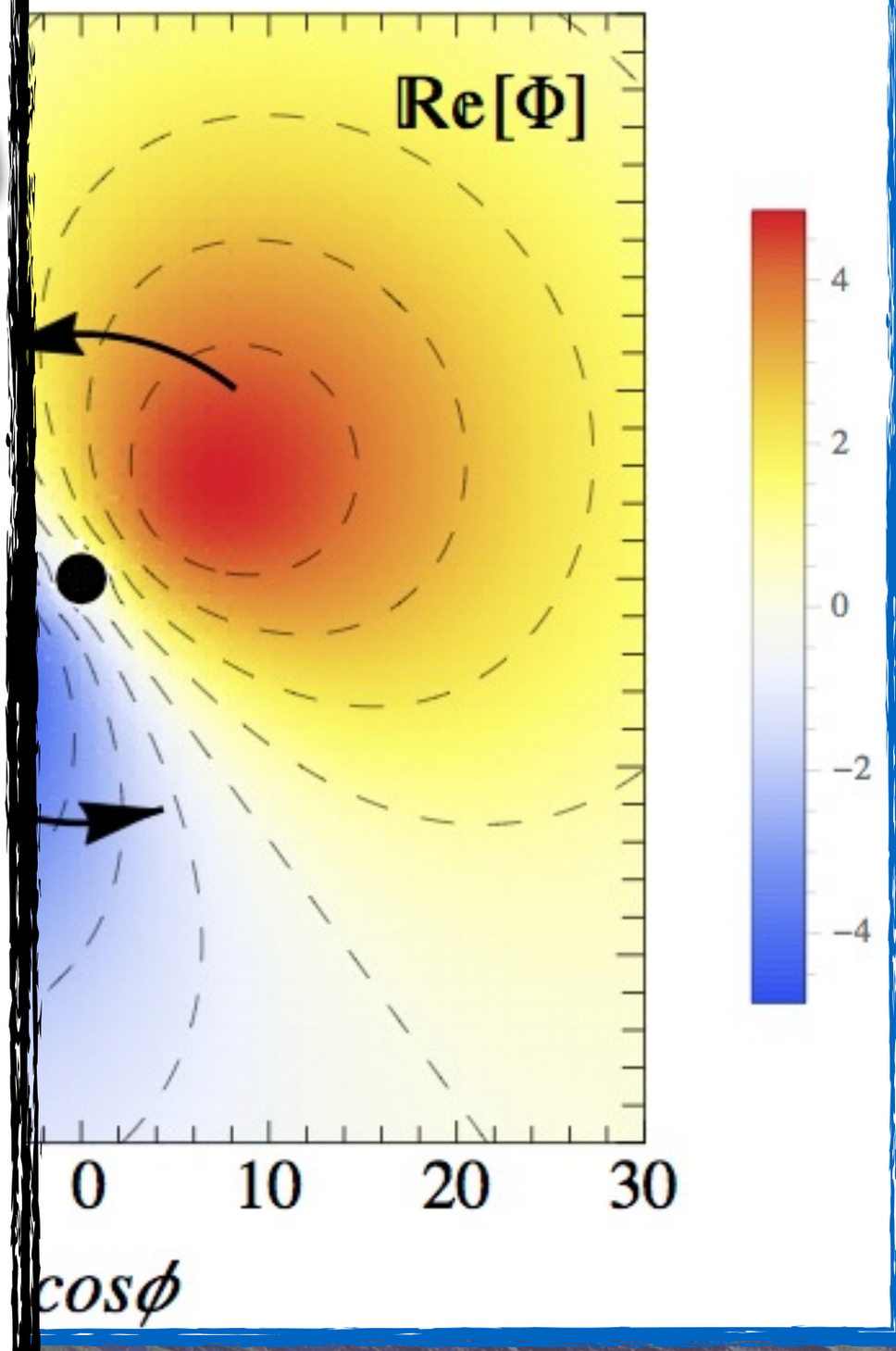
Radiowave Telescope



BH with axion cloud

$\vec{E} \cdot \vec{B}$

Quasar



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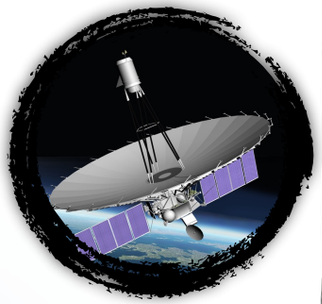

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BH with axion cloud

$\vec{E} \cdot \vec{B}$

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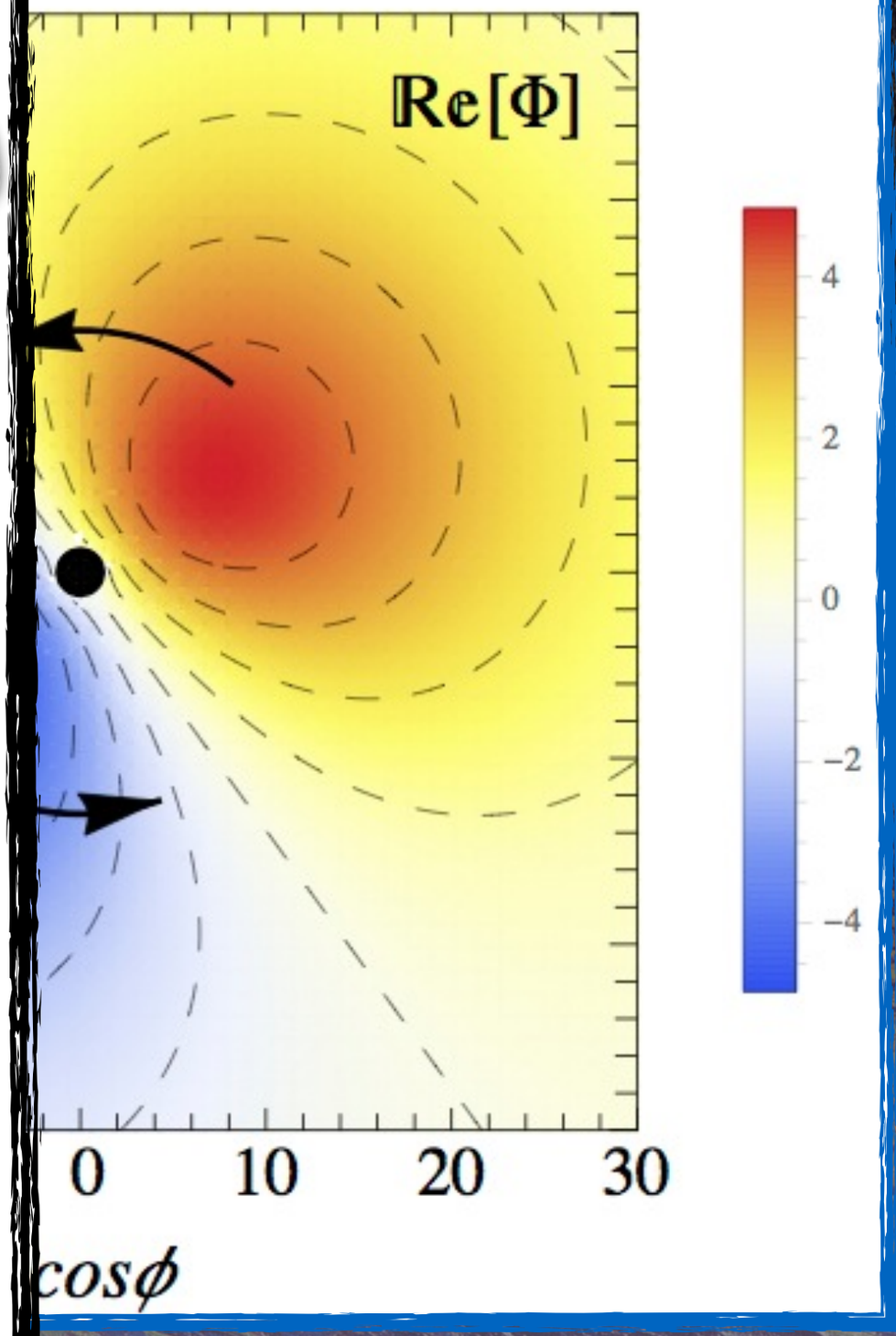

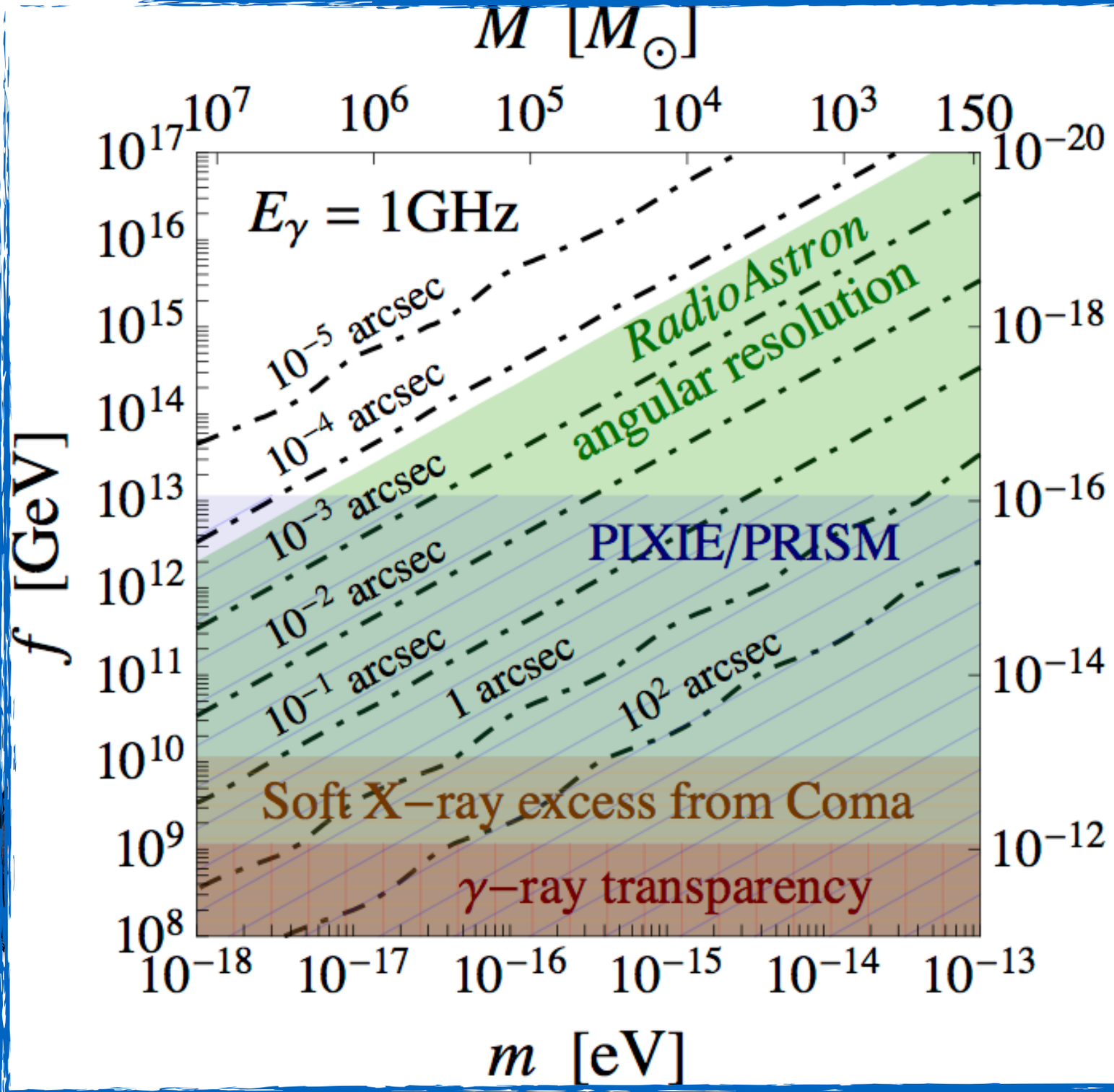
M [M⊙]
10^7
10^6
10^5
10^4
10^3
150
E_γ = 1GHz
10^−5 arcsec
10^−4 arcsec
10^−3 arcsec
10^−2 arcsec
10^−1 arcsec
1 arcsec
10^2 arcsec
RadioAstron
angular resolution
PIXIE/PRISM
Soft X−ray excess from Coma
γ−ray transparency
f [GeV]
10^17
10^16
10^15
10^14
10^13
10^12
10^11
10^10
10^9
10^8
10^−20
10^−18
10^−16
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10^−12
g_aγγ [GeV^−1]
10^−18
10^−17
10^−16
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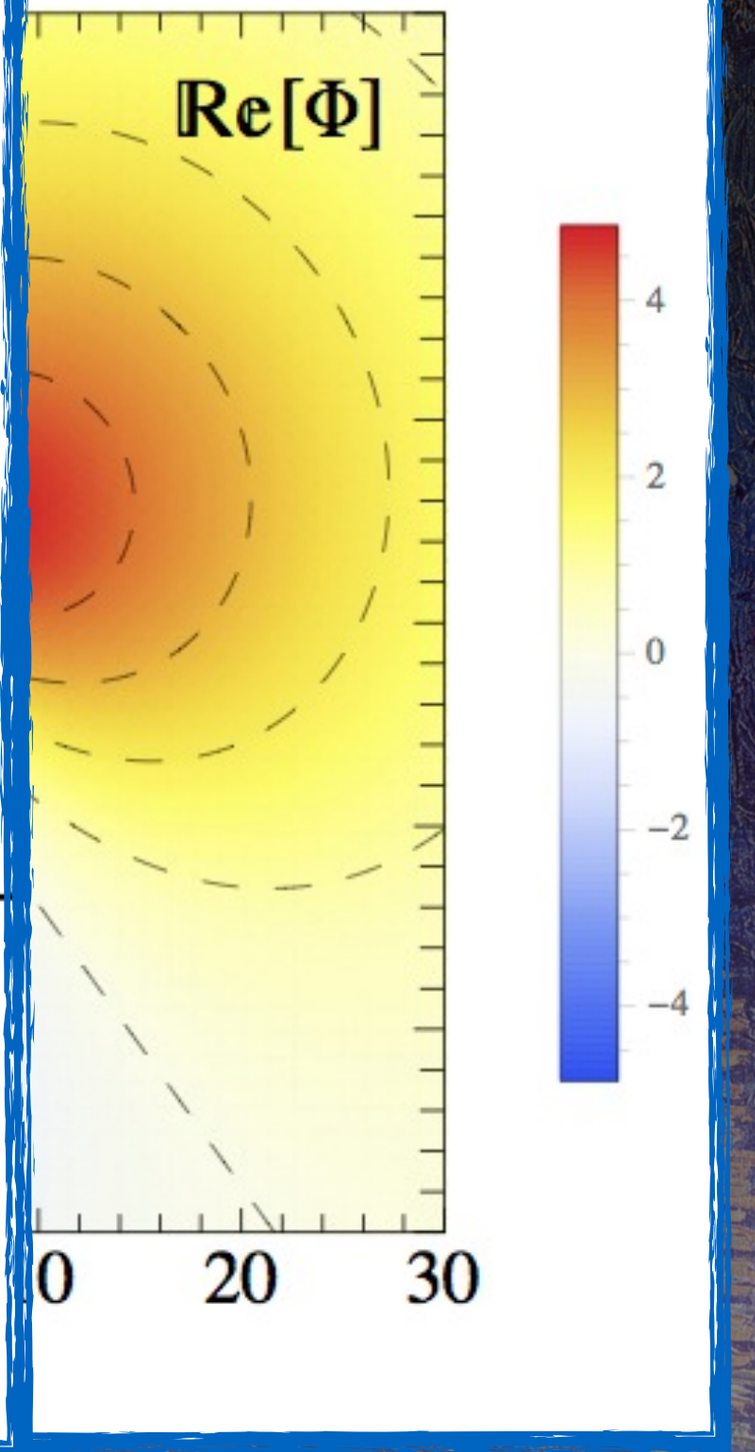
ℝe[Φ]
4
2
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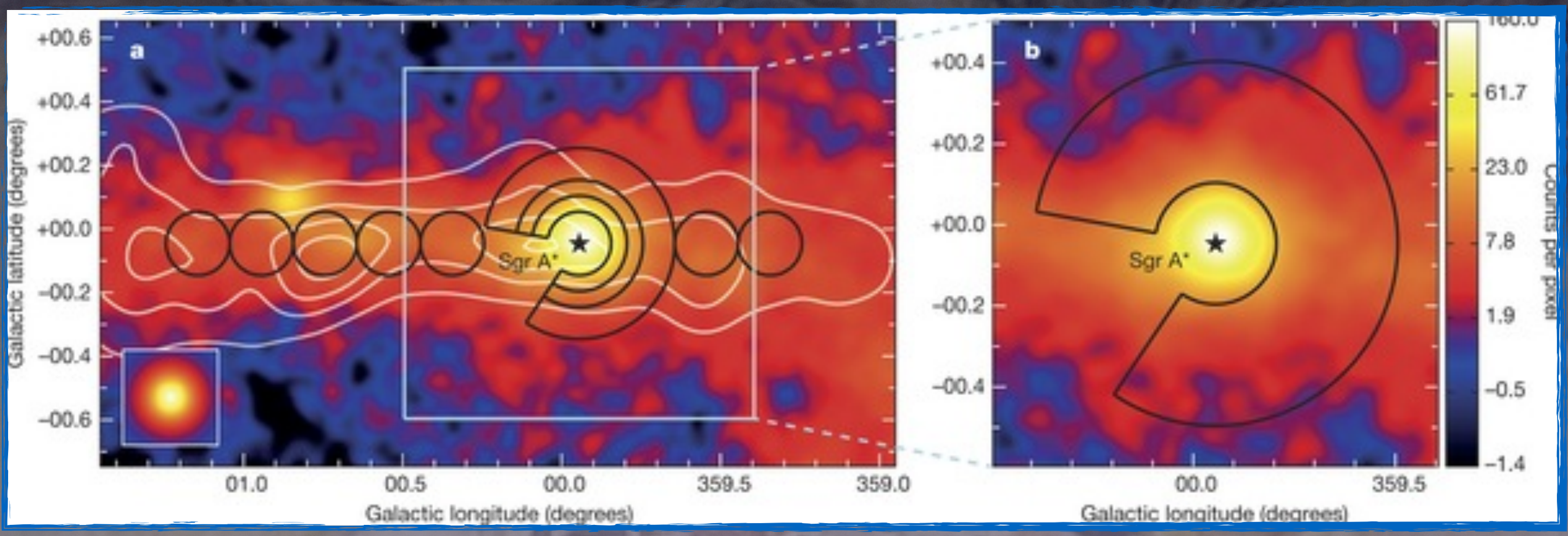
Cosmic rays

Cosmic rays
Work in progress

With C. Evoli, D. Gaggero,
D. Grasso, A. Marinelli, M. Taoso



Thank you all,
I really enjoyed very much
my first year at CERN.