

Theoretical Particle Physics University of Bergen

Professor Per Osland

Ph. D. students:

Nils-Erik Bomark (Univ. funding), Mahdi Purmohammadi (private), Alexander Vereshagin (Quota program + private)

Master students:

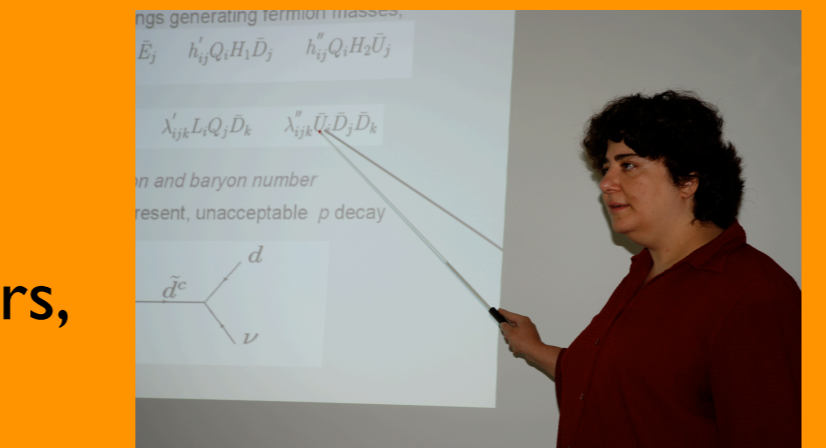
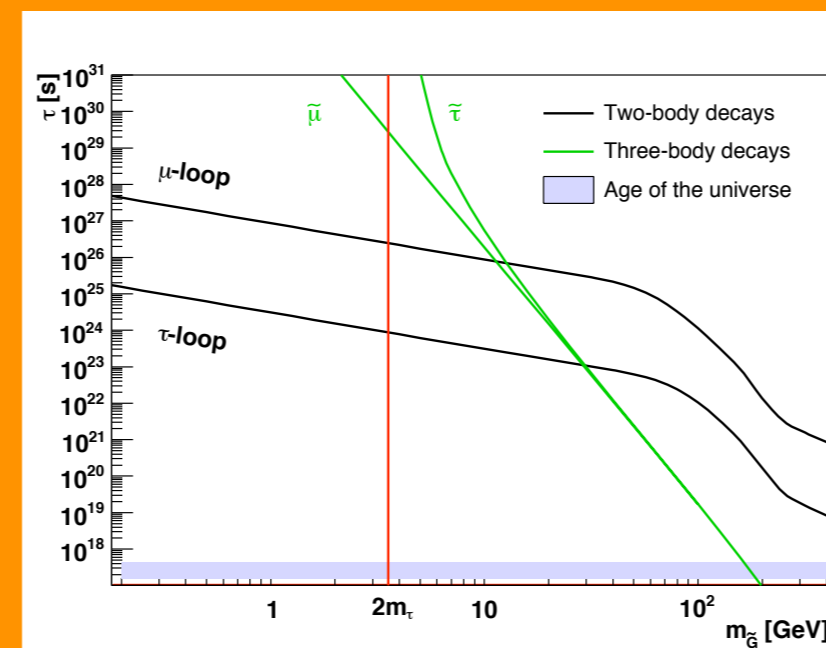
Åsmund Blitzner, Anders Kvellestad, Richard Olsen (Utrecht), Alexey Tochin, Are Viken



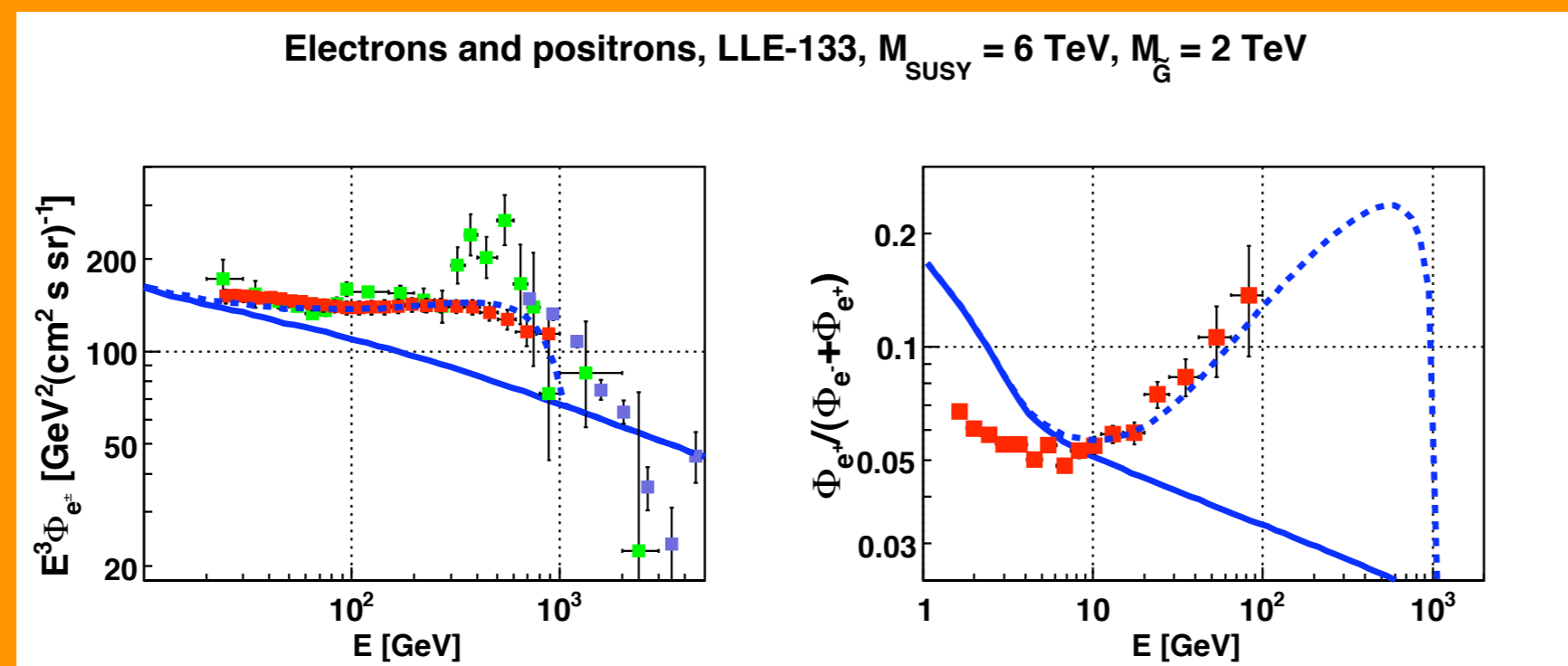
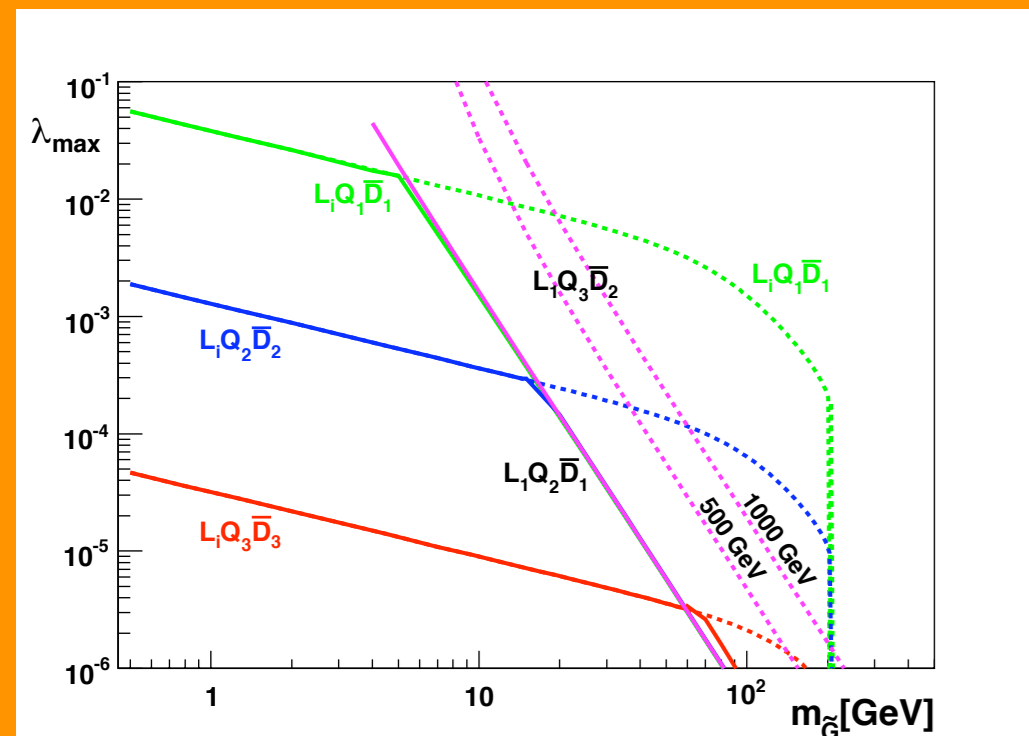
Gravitino dark matter

With: N.E. Bomark, S. Lola, A.R. Raklev

S. Lola, P. Osland, A. R. Raklev,
Radiative gravitino decays from R-parity violation,
Phys. Lett. B 656 (2007) 83-90



N. E. Bomark, S. Lola, P. Osland, A. R. Raklev,
Gravitino Dark Matter and the Flavour Structure of R-violating Operators,
Phys. Lett. B 677 (2009) 62-70



Presently studying PAMELA and Fermi LAT data

Higgs-sector

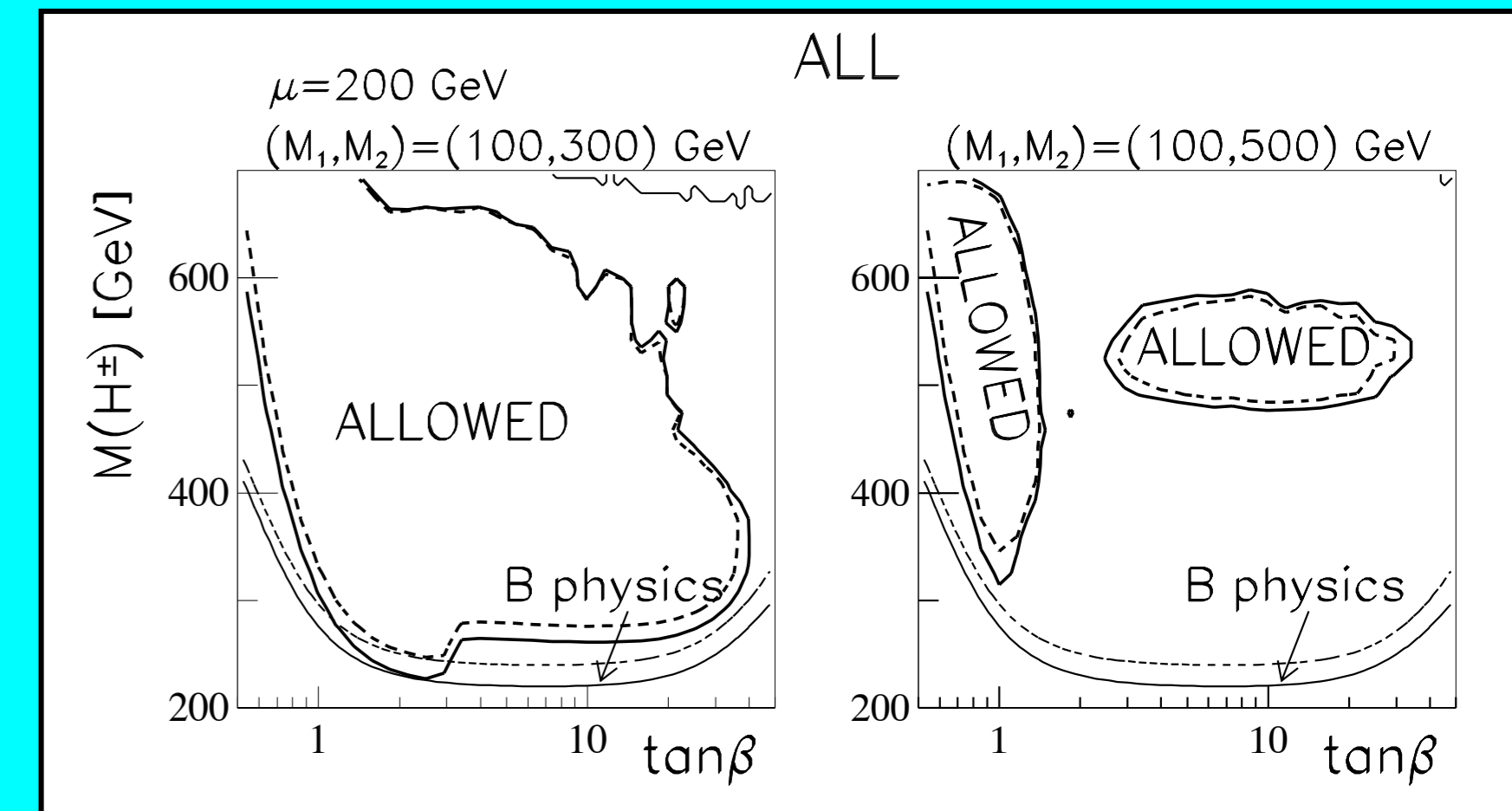
With: W. Grimus, W. Khater, L. Lavoura, A.W. El Kaffas, O.M. OGREID

A. W. El Kaffas, W. Khater, O. M. OGREID, P. Osland,
Consistency of the Two Higgs Doublet Model and CP violation
in top production at the LHC,
Nucl. Phys. B 775 (2007) 45

A. W. El Kaffas, O. M. OGREID, P. Osland,
Constraining the Two-Higgs-Doublet-Model parameter space,
Phys. Rev. D 76 (2007) 095001

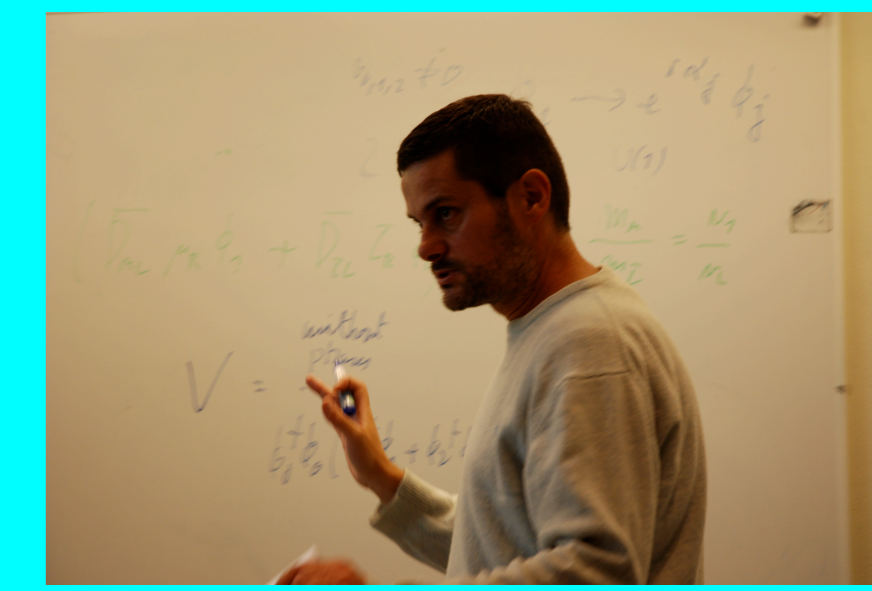


Mapped out allowed regions of
2HDM parameter space



W. Grimus, L. Lavoura, O.M. OGREID, P. Osland,
A precision constraint on multi-Higgs-doublet models,
Journal of Physics G: Nuclear and Particle Physics
35 (2008) 075001

W. Grimus, L. Lavoura, O.M. OGREID, P. Osland,
The oblique parameters in multi-Higgs-doublet models,
Nucl. Phys. B 801 (2008) 81-96



S, T, U determined

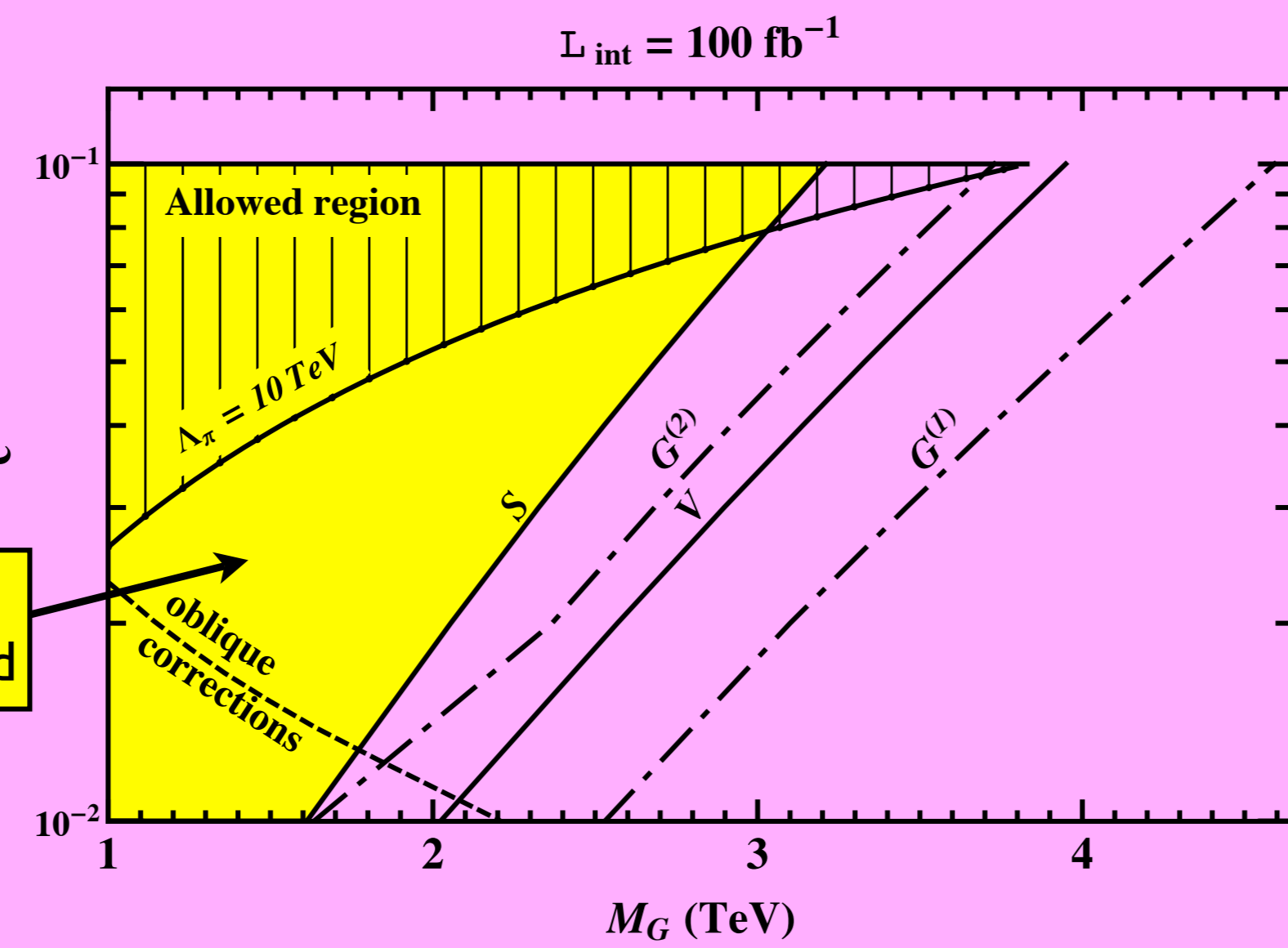
Spin and Z' identification

Collaborators: A.A. Pankov, N. Paver, A.V. Tsytrinov

P. Osland, A.A. Pankov, N. Paver, A.V. Tsytrinov,
Spin identification of the Randall-Sundrum resonance
in lepton-pair production at the LHC,
Phys. Rev. D 78 (2008) 035008

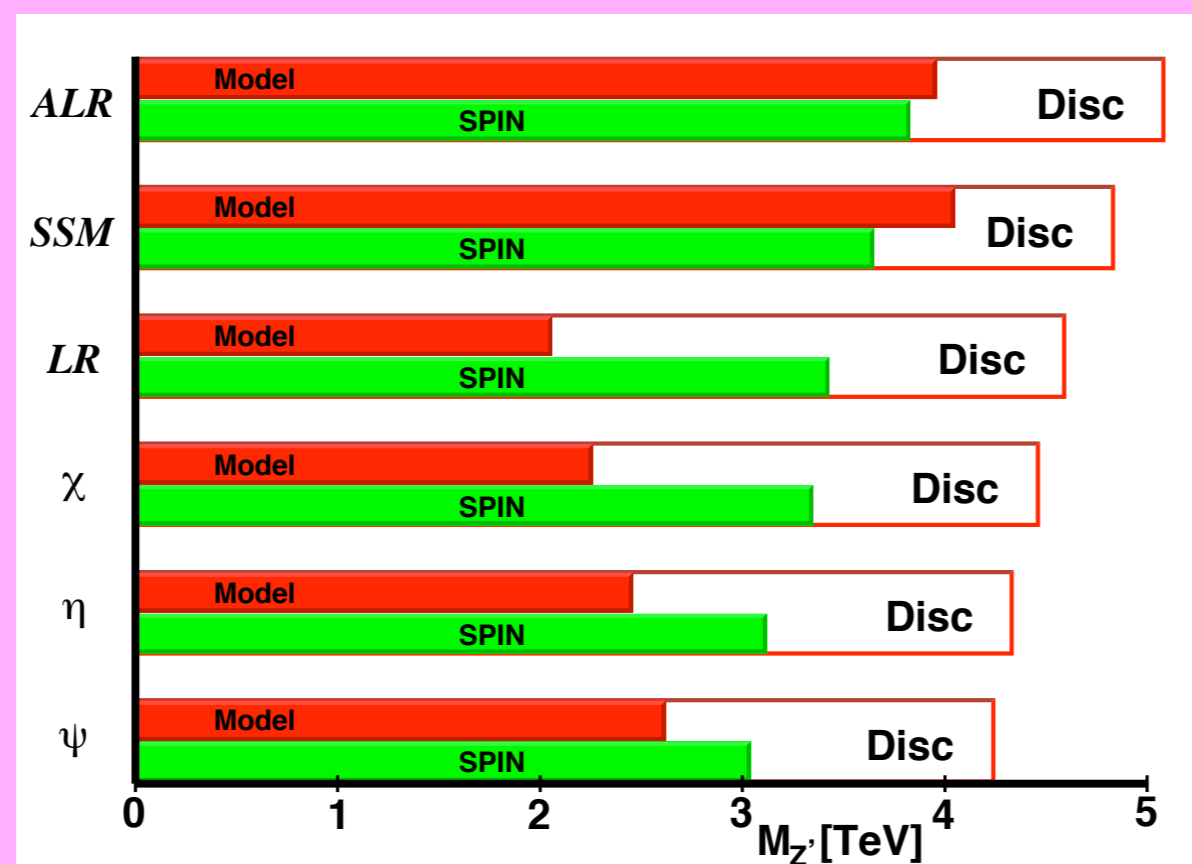


Scalar excluded,
second graviton produced



P. Osland, A.A. Pankov, N. Paver, A.V. Tsytrinov,
Spin and model identification of Z' bosons at the LHC,
Phys. Rev. D 79 (2009) 115021

Spin determination,
Model identification



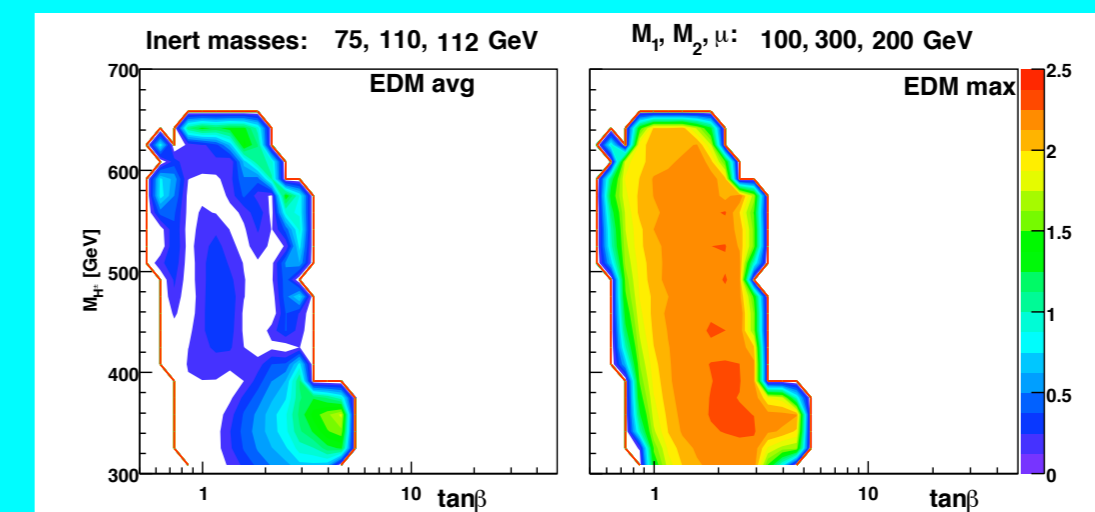
Scalar Dark Matter

With: B. Grzadkowski, O.M. OGREID, M. Purmohammadi

2HDM plus inert doublet Dark Matter

Extension of model by Barbieri et al,
allowing for CP violation

B. Grzadkowski, O. M. OGREID, P. Osland,
Natural Multi-Higgs Model with Dark Matter and CP Violation,
Phys. Rev. D 80 (2009) 055013



Mapped out allowed regions of parameter space, for
DM particles around 75-80 GeV and 500-1000 GeV



Continue with M. Purmohammadi
Searching for heavier DM

Singlet DM

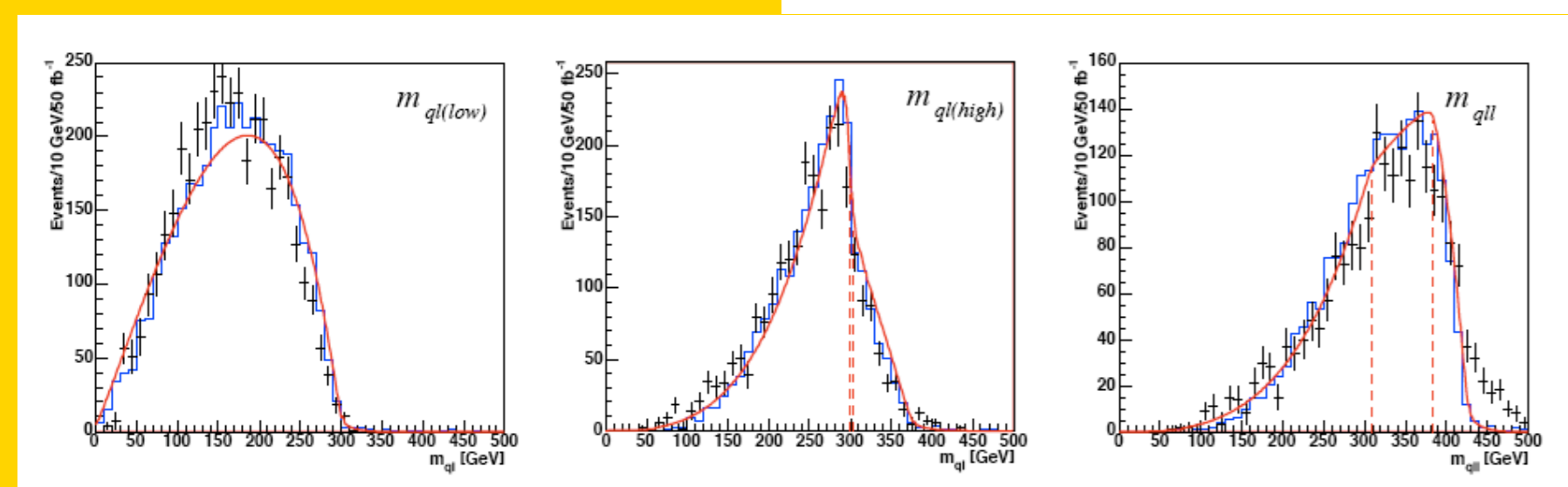
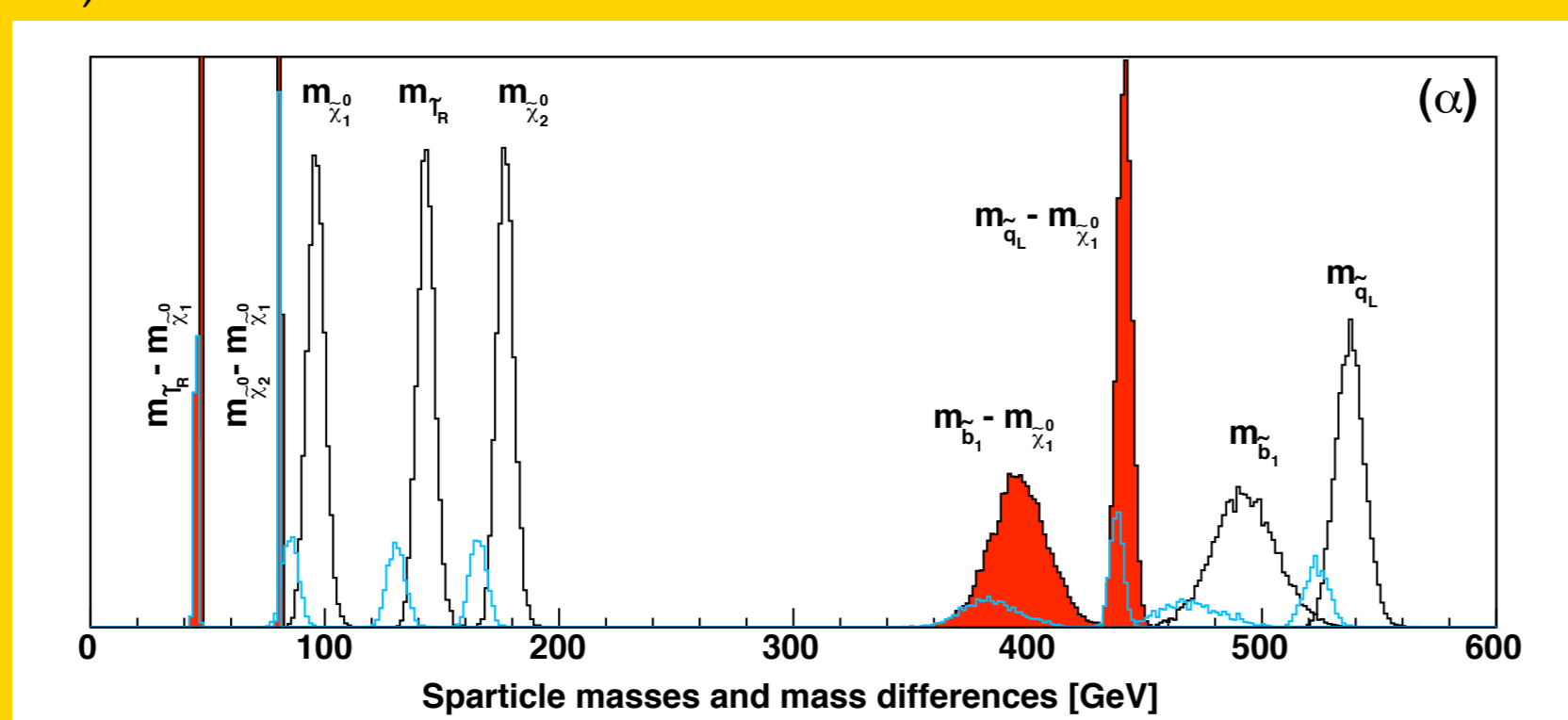
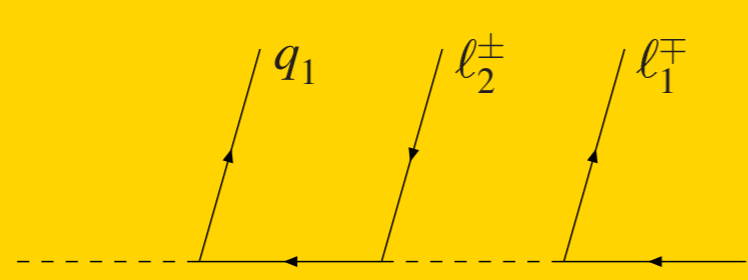
2HDM plus scalar singlet Dark Matter

SUSY mass studies

Collaborators: B.K. Gjelsten, D.J. Miller, A.R. Raklev

B. K. Gjelsten, D. J. Miller, P. Osland,
Measurement of SUSY masses via cascade decays for SPS 1a,
J. High Energy Phys. 12 (2004) 003

B. K. Gjelsten, D. J. Miller, P. Osland,
Measurement of the Gluino Mass via Cascade Decays for SPS 1a,
J. High Energy Phys. 06 (2005) 015



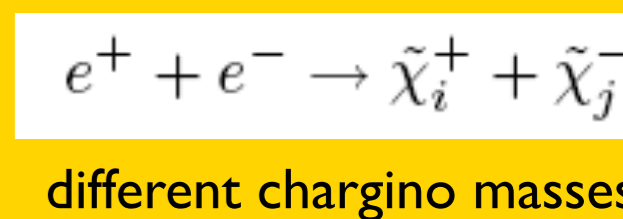
D. J. Miller, P. Osland, A. R. Raklev,
Invariant mass distributions in cascade decays,
J. High Energy Phys. 03 (2006) 034

Results quoted in ATLAS TDR

SUSY CP violation

Collaborator: A. Vereshagin

P. Osland and A. Vereshagin,
CP violation in unpolarized $e^+e^- \rightarrow \tilde{\chi}_i^+ \tilde{\chi}_j^-$ to charginos at one loop level,
Phys. Rev. D 76 (2007) 036001

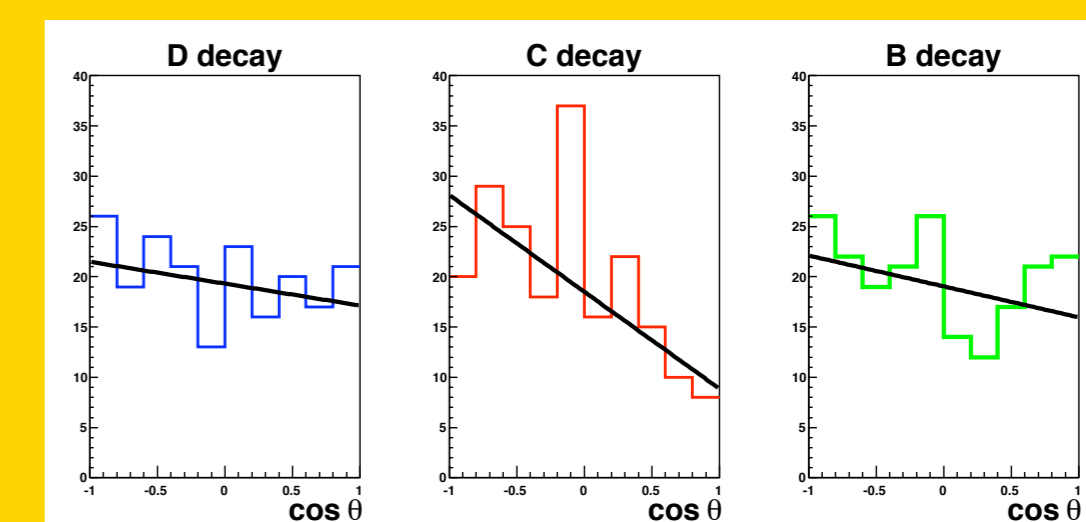
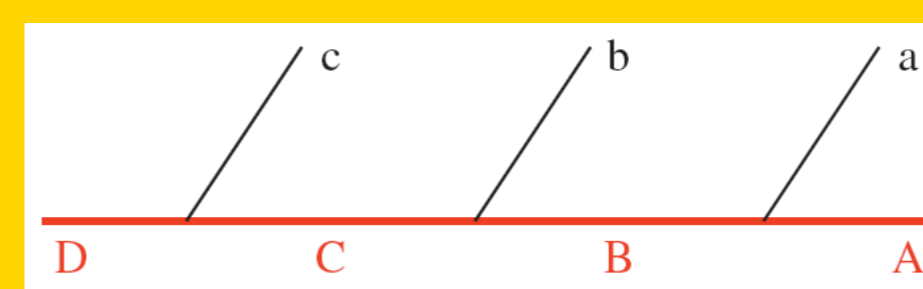


P. Osland, J. Kalinowski, K. Rolbiecki, A. Vereshagin,
Polarization-independent CP-odd Observable in e^+e^- Chargino Production at One Loop,
Proc. 2007 International Linear Collider Workshop (LCWS07 and ILC07),
Hamburg, Germany, 30 May - 3 Jun 2007 (arXiv:0709.3358)

SUSY spin studies

Collaborators: D.J. Miller, A.R. Raklev

In progress: Can neutralino spin be
extracted from angular distributions?



SUSY hierarchy studies

Collaborators: B.K. Gjelsten, D.J. Miller

In progress: In 24-parameter MSSM,
other hierarchies not seen in CMSSM