



**Andreas
Crivellin**

**Research Interests
and recent articles**

CERN Theory Retreat

CV

- 2002 - 2010:
 - Diploma and PhD in Karlsruhe (advisor Ulrich Nierste)
- 2010 - 2013
 - PostDoc in Bern (Christoph Greub)
- 2013 – 2015
 - Marie Curie fellow at CERN
- Starting 2016:
 - Ambizione fellowship of the SNSF at the PSI

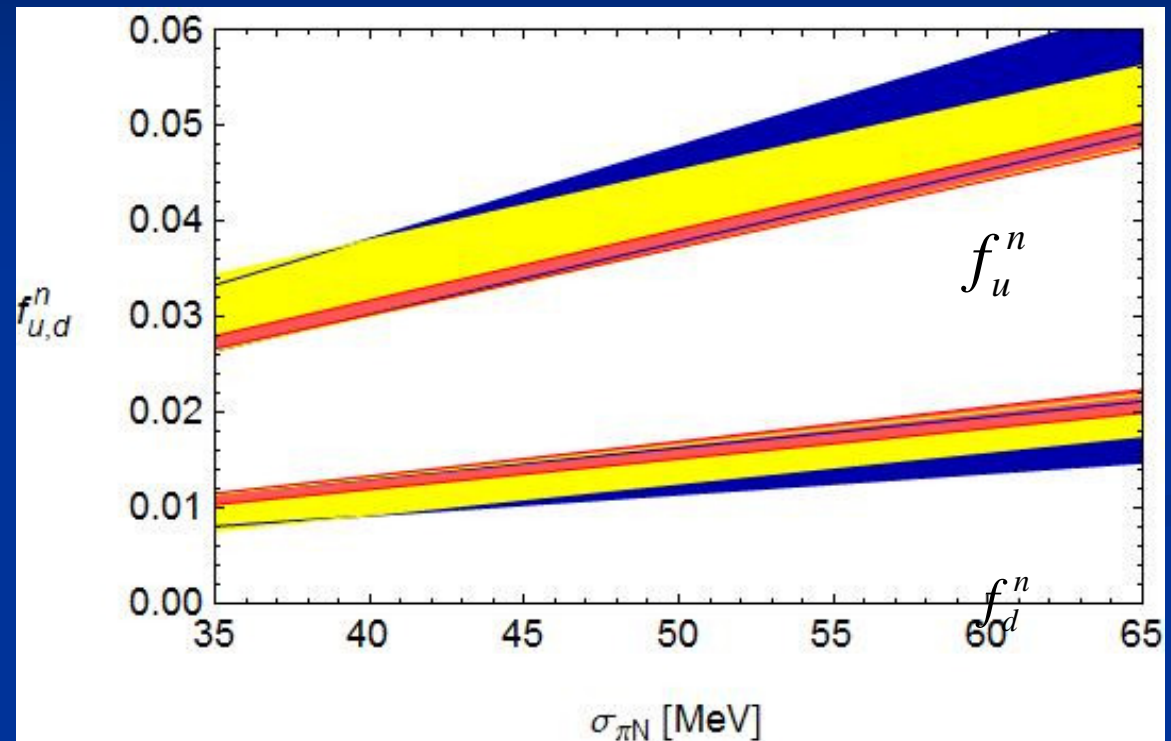
Research Interests

- Flavour Physics
- MSSM
 - Effective Higgs vertices
 - Chirally enhanced corrections
 - Radiative Flavour violation
- 2HDM
- Tauonic B decays
- Dark Matter
- EFT

Scalar quark couplings to the nucleon

A.C., M. Hoferichter, M. Procura arXiv:1312.4951

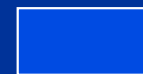
- Traditional approach: SU(3) chiral perturbation
- Better: SU(2) chiral perturbation theory and f_s from lattice
- Important for
 - DM direct detection
 - $\mu \rightarrow e$ conversion



our result



SU(3)

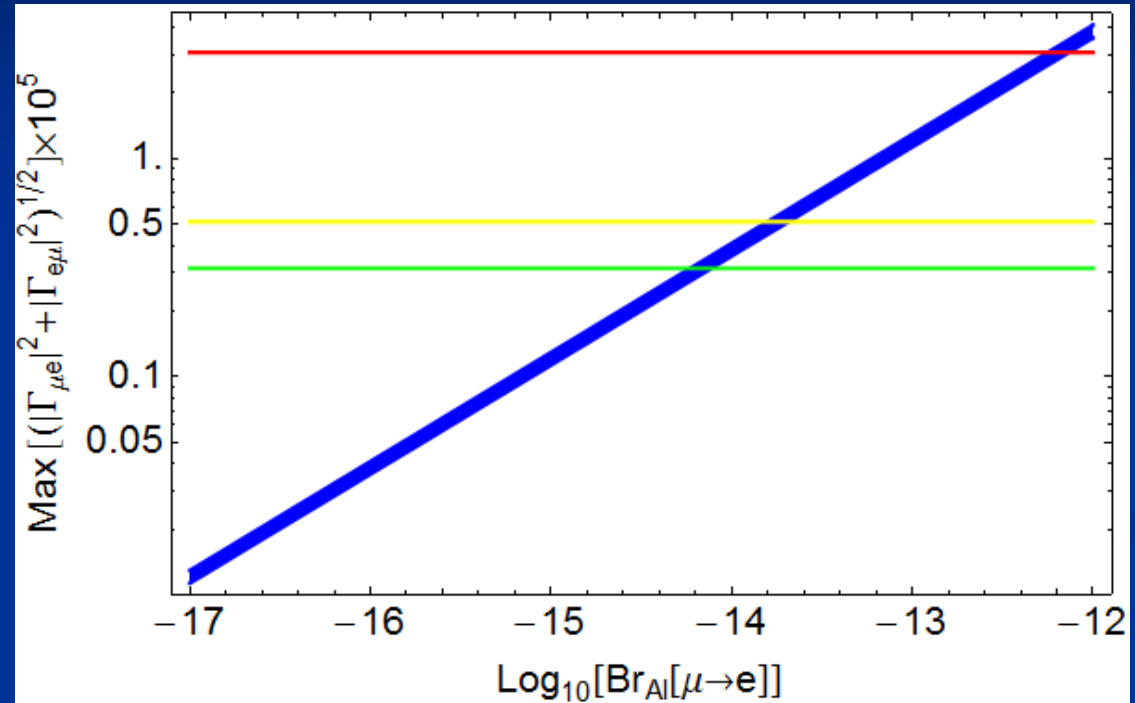


SU(3) with f_s

$\mu \rightarrow e$ conversion

A.C., M. Hoferichter, M. Procura arXiv:1404.7134

- Excellent experimental prospects:
 $\text{Br}[\mu \rightarrow e] < 10^{-17}$
- Sensitive to Higgs mediated Flavour violation



$\Gamma_{\mu e} : \mu\text{-}e\text{-}h^0$ coupling

- | | |
|--|---|
| $\mu \rightarrow e$ conversion | $\mu \rightarrow e\gamma$ (upgrade 1) |
| $\mu \rightarrow e\gamma$ (now) | $\mu \rightarrow e\gamma$ (upgrade 2) |

Effective Field Theory

Approach to Dark Matter

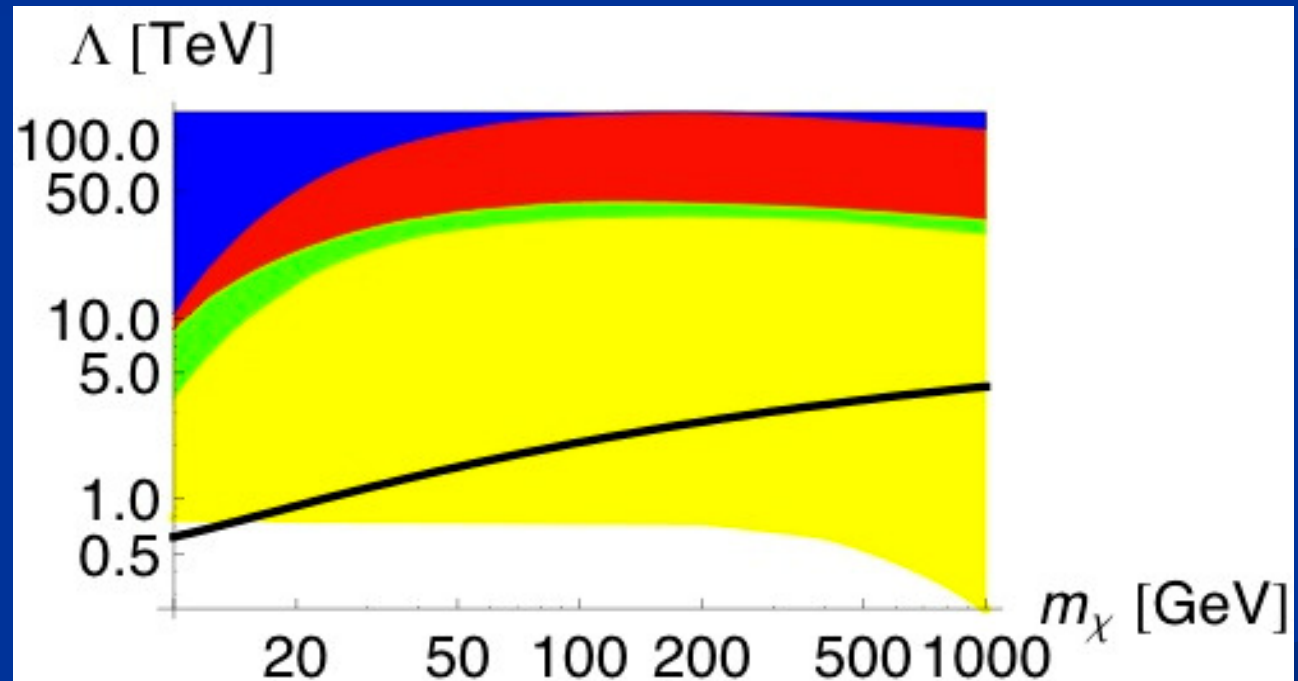
A.C., F. d'Eramo, M. Procura, arXiv:1402.1173

A.C., U. Haisch, arXiv:1408:5046

$$C_{qq}^{VA} = 1$$

We assume that DM is:

- A SM singlet
- A Dirac fermion
- Impact of loop-effects
- Correlations with LHC searches



relic density

Effective Field Theory

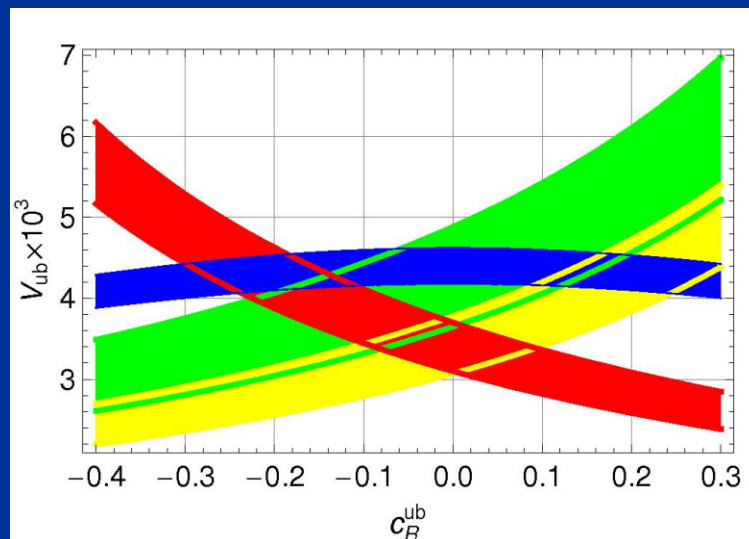
Approach to Flavour Physics





A.C., S. Pokorski, arXiv:1407.1320

A.C., J. Rosiek, S.Najjari, arXiv:1312:0634

- Lepton flavour-violation: 1-Loop predictions for all gauge invariant dim-6 operators
- Determination of CKM elements

➔ The differences cannot be explained with NP



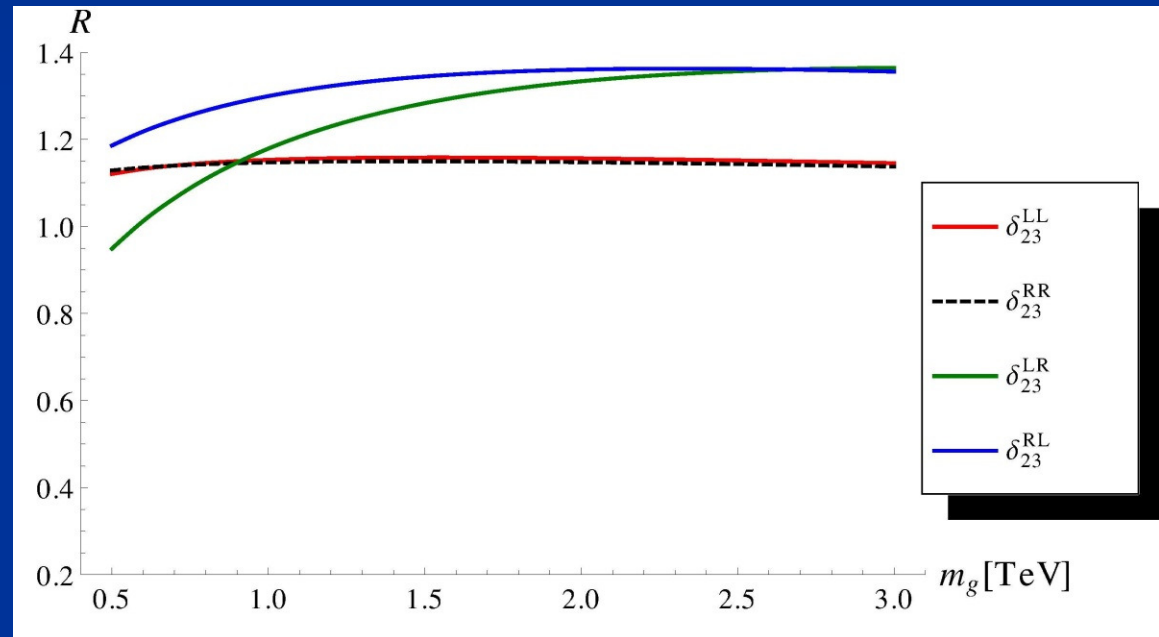
	inclusive
	$B \rightarrow \pi l \nu$
	$B \rightarrow \tau \nu$
	$B \rightarrow \rho l \nu$

stop \rightarrow charm + neutralino

J. Aebischer, A.C., C. Greub, arXiv:1410.4589
A.C., U. Haisch, L. Tunstall, in preperation

1-Loop SQCD corrections

- Shift between on-shell and $\overline{\text{DR}}$ mass very important
- Large corrections for trilinear terms



- Significant impact on the LHC bounds from $\tilde{t} \rightarrow Wb\tilde{\chi}^0$
➔ Very light stop masses allowed in non-minimal FV