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To whom it may concern

Letter of Recommendation for Dr. Christian Gross

Dear Colleague,

Herewith I am supporting Christian Gross' application for a postdoctoral position in particle theory at your institution.

Christian has been a postdoc in my group from 2009-2011. When coming to Dortmund, he started to work in a (for himself) new research area, theoretical flavor physics. As part of concrete projects he studied flavor and the effects of a generational structure in supersymmetric models. This included possible explanations of the Standard Models Yukawa textures through family symmetries, but also covered the implications of flavor for supersymmetry breaking, and reaches phenomenological low energy tests of the latter. Christian entered these mature fields with full immersion.

As a first project we studied models with hybrid supersymmetry breaking, with one source being anomaly mediation and the second one originating from Planck scale physics. While the former is minimally flavor violating, the latter can have flavor violation unrelated to the known Yukawa matrices. An interesting aspect in this set-up, if realized with comparable soft terms, is the link between the problematic tachyonic slepton mass terms of pure anomaly mediation and the potentially large flavor violation from the Planck scale, leading to leptonic flavor signatures. We published this in Phys.Rev. D83 (2011) 095015.

Christians contribution to the project was more than order one. His expertise in supersymmetric model building from his diploma thesis with Arthur Hebecker and subsequently his PhD under supervision of Jan Louis and Laura Covi has been very beneficial to the project.

In collaboration with other members of the Dortmund quark flavor group, Christian studied the implications of recent data on  $|\Delta B| = |\Delta S| = 1$  processes, notably  $B \rightarrow K^{(*)} \ell^+ \ell^-$  decays, for the supersymmetric flavor sector, published in JHEP08(2012)152 (with Arnd Behring, GH and Stefan Schacht). New constraints on squark flavor violation have been obtained on generational mixing in the up-sector involving scalar tops and charms. As these constrain the trilinear SUSY breaking terms ( $A$ -terms), there are interesting links with the lightest Higgs mass and light stop models, both of which require large  $A$ -terms. The constraints on models with radiative flavor-generation by  $A$ -terms are in part stronger than those from kaon mixing, and provide a challenge. Top FCNCs are found to be out of reach for the LHC within foreseeable luminosities.

Christian specifically worked on checking the SUSY matching contributions to the effective hamiltonian, as existing formulae in the literature in the mass insertion approximation didnt turn out to be in agreement with the corresponding limit of the full formulae. His knowledge on the susy and calculational foundations to all aspects of this project is sound.

Christian made in summer 2011 a scientific visit of a few weeks to Prof. Martin Schmaltz at Boston U.. This resulted in a recent preprint "Light axigluon explanation of the Tevatron  $t\bar{t}$  asymmetry and multijet signals at the LHC" arXiv:1209.6375 [hep-ph]. Furthermore, he has a recent paper explaining the large value of  $\theta_{13}$ , Nucl. Phys. B 866, 255 (2013), together with his present employer Prof. Stefan Antusch and collaborateurs.

Christian is a very thorough researcher. He works steadily and very independently. In less than a year he has acquainted sound knowledge in broad aspects of supersymmetric flavor physics. During his diploma and PhD theses Christian worked mainly on high energy aspects of supersymmetric models. This includes the study of string-inspired settings, within GUTs and also in connection to cosmology. From the topics he worked on since 2009 one would conclude that Christian did make the transition to a phenomenologist with broad interests, and linking model building to experiment. He actually works on 'hot topics'.

I recommend Christian strongly for a postdoctoral position in theoretical particle physics.

Please do not hesitate to contact me if there is further information needed.

Yours sincerely,

Gudrun Hiller