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# Search for new physics with the $M_{T2}$ variable in all-jets final states produced in pp collisions at $\sqrt{s} = 13$ TeV



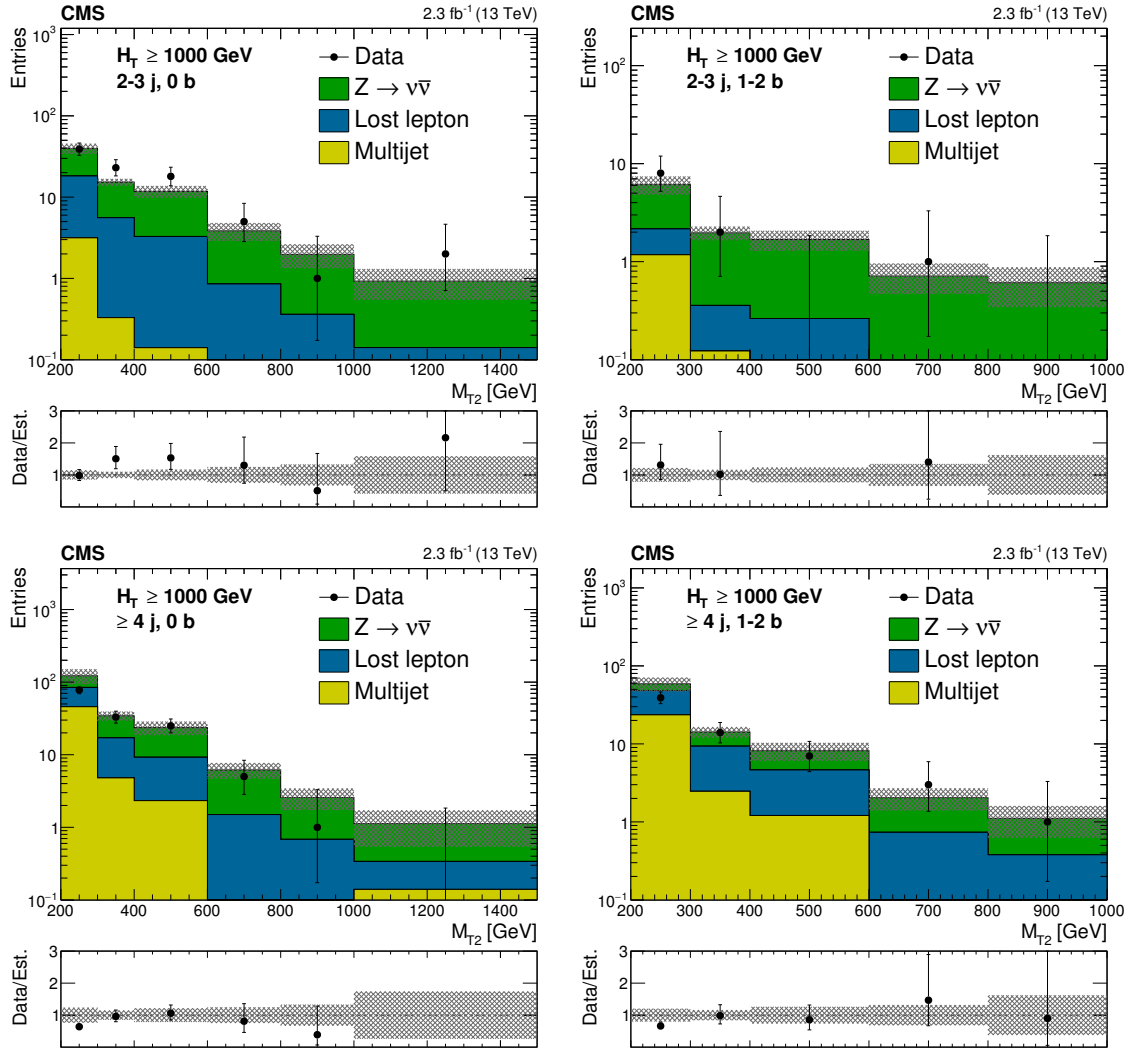
## The CMS collaboration

*E-mail:* [cms-publication-committee-chair@cern.ch](mailto:cms-publication-committee-chair@cern.ch)

**ABSTRACT:** A search for new physics is performed using events that contain one or more jets, no isolated leptons, and a large transverse momentum imbalance, as measured through the  $M_{T2}$  variable, which is an extension of the transverse mass in events with two invisible particles. The results are based on a sample of proton-proton collisions collected at a center-of-mass energy of 13 TeV with the CMS detector at the LHC, and that corresponds to an integrated luminosity of  $2.3 \text{ fb}^{-1}$ . The observed event yields in the data are consistent with predictions for the standard model backgrounds. The results are interpreted using simplified models of supersymmetry and are expressed in terms of limits on the masses of potential new colored particles. Assuming that the lightest neutralino is stable and has a mass less than about 500 GeV, gluino masses up to 1550–1750 GeV are excluded at 95% confidence level, depending on the gluino decay mechanism. For the scenario of direct production of squark-antisquark pairs, top squarks with masses up to 800 GeV are excluded, assuming a 100% branching fraction for the decay to a top quark and neutralino. Similarly, bottom squark masses are excluded up to 880 GeV, and masses of light-flavor squarks are excluded up to 600–1260 GeV, depending on the degree of degeneracy of the squark masses.

**KEYWORDS:** Hadron-Hadron scattering (experiments), Supersymmetry

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**Figure 19.** Comparison of estimated background and observed data events in inclusive topological regions, as labeled in the legends, as a function of  $M_{T2}$ , for events with  $H_T > 1000$  GeV. The background prediction is formed by summing pre-fit values for all signal regions included in each plot. Hatched bands represent the full uncertainty in the background estimate.

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Gomez, T. Rodrigo, A. Ruiz-Jimeno, L. Scodellaro, N. Trevisani, I. Vila, R. Vilar Cortabitarte

**CERN, European Organization for Nuclear Research, Geneva, Switzerland**

D. Abbaneo, E. Auffray, G. Auzinger, M. Bachtis, P. Baillon, A.H. Ball, D. Barney, P. Bloch, A. Bocci, A. Bonato, C. Botta, T. Camporesi, R. Castello, M. Cepeda, G. Cerminara, M. D'Alfonso, D. d'Enterria, A. Dabrowski, V. Daponte, A. David, M. De Gruttola, F. De Guio, A. De Roeck, E. Di Marco<sup>43</sup>, M. Dobson, M. Dordevic, B. Dorney, T. du Pree, D. Duggan, M. Dünser, N. Dupont, A. Elliott-Peisert, S. Fartoukh, G. Franzoni, J. Fulcher, W. Funk, D. Gigi, K. Gill, M. Girone, F. Glege, S. Gundacker, M. Guthoff, J. Hammer, P. Harris, J. Hegeman, V. Innocente, P. Janot, H. Kirschenmann, V. Knünz, M.J. Kortelainen, K. Kousouris, M. Krammer<sup>1</sup>, P. Lecoq, C. Lourenço, M.T. Lucchini, N. Magini, L. Malgeri, M. Mannelli, A. Martelli, F. Meijers, S. Mersi, E. Meschi, F. Moortgat, S. Morovic, M. Mulders, H. Neugebauer, S. Orfanelli<sup>44</sup>, L. Orsini, L. Pape, E. Perez, M. Peruzzi, A. Petrilli, G. Petrucciani, A. Pfeiffer, M. Pierini, A. Racz, T. Reis, G. Rolandi<sup>45</sup>, M. Rovere, M. Ruan, H. Sakulin, J.B. Sauvan, C. Schäfer, C. Schwick, M. Seidel, A. Sharma, P. Silva, M. Simon, P. Sphicas<sup>46</sup>, J. Steggemann, M. Stoye, Y. Takahashi, D. Treille, A. Triossi, A. Tsirou, V. Veckalns<sup>47</sup>, G.I. Veres<sup>21</sup>, N. Wardle, A. Zagozdinska<sup>35</sup>, W.D. Zeuner

**Paul Scherrer Institut, Villigen, Switzerland**

W. Bertl, K. Deiters, W. Erdmann, R. Horisberger, Q. Ingram, H.C. Kaestli, D. Kotlinski, U. Langenegger, T. Rohe

**Institute for Particle Physics, ETH Zurich, Zurich, Switzerland**

F. Bachmair, L. Bäni, L. Bianchini, B. Casal, G. Dissertori, M. Dittmar, M. Donegà, P. Eller, C. Grab, C. Heidegger, D. Hits, J. Hoss, G. Kasieczka, P. Lecomte<sup>†</sup>, W. Lustermann, B. Mangano, M. Marionneau, P. Martinez Ruiz del Arbol, M. Masciovecchio, M.T. Meinhard, D. Meister, F. Micheli, P. Musella, F. Nessi-Tedaldi, F. Pandolfi, J. Pata, F. Pauss, G. Perrin, L. Perrozzi, M. Quittnat, M. Rossini, M. Schönenberger, A. Starodumov<sup>48</sup>, M. Takahashi, V.R. Tavolaro, K. Theofilatos, R. Wallny

**Universität Zürich, Zurich, Switzerland**

T.K. Aarrestad, C. AMSler<sup>49</sup>, L. Caminada, M.F. Canelli, V. Chiochia, A. De Cosa, C. Galloni, A. Hinzmann, T. Hreus, B. Kilminster, C. Lange, J. Ngadiuba, D. Pinna, G. Raucó, P. Robmann, D. Salerno, Y. Yang

**National Central University, Chung-Li, Taiwan**

T.H. Doan, Sh. Jain, R. Khurana, M. Konyushikhin, C.M. Kuo, W. Lin, Y.J. Lu, A. Pozdnyakov, S.S. Yu

**National Taiwan University (NTU), Taipei, Taiwan**

Arun Kumar, P. Chang, Y.H. Chang, Y.W. Chang, Y. Chao, K.F. Chen, P.H. Chen, C. Dietz, F. Fiori, W.-S. Hou, Y. Hsiung, Y.F. Liu, R.-S. Lu, M. Miñano Moya, E. Paganis, A. Psallidas, J.f. Tsai, Y.M. Tzeng