

Professor Peter Skands
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Research interests

Theoretical High Energy Physics
Particle Physics Phenomenology
Collider Physics
Quantum Chromodynamics
Computer Physics, Monte Carlo Event Generators
Collaborations: PYTHIA, VINCIA, LHC@home/Test4Theory

Qualifications

Theoretical Physics, PhD, Phenomenological Studies of Supersymmetry and the Strong Force, Lunds Universitet (Lund University)
1 Sept 2001 → 14 Oct 2004
Award Date: 14 Oct 2004
Physics, Candidatus Scientiarum (5-year Masters degree), L-Violating Supersymmetry: Implementation in PYTHIA and Study of LHC Discovery Potential
2000 → 2001
Award Date: 6 Aug 2001

Employment

Professor

School of Physics and Astronomy
MONASH UNIVERSITY
1 Oct 2018 → present

Staff Scientist (LD)

CERN - Conseil Européen pour la Recherche Nucléaire (European Organization for Nuclear Research)
Geneva, Switzerland
1 Oct 2009 → 30 Sept 2014

Associate Scientist (tenure-track)

Fermi National Accelerator Laboratory
Batavia, United States of America
15 Mar 2007 → 30 Sept 2009

Research Associate (post doc)

Fermi National Accelerator Laboratory
Batavia, United States of America
1 Nov 2004 → 14 Mar 2007

Awards

Beautiful strings

Skands, P., Egede, U. & Kreps, M.

Research output

Event generators for high-energy physics experiments

Campbell, J. M. (ed.), Diefenthaler, M. (ed.), Hobbs, T. J. (ed.), Höche, S. (ed.), Isaacson, J. (ed.), Kling, F. (ed.), Mrenna, S. (ed.), Reuter, J. (ed.), Alioli, S., Andersen, J. R., Andreopoulos, C., Ankowski, A. M., Aschenauer, E. C., Ashkenazi, A., Baker, M. D., Barrow, J. L., van Beekveld, M., Bewick, G., Bhattacharya, S., Bierlich, C., & 191 others Bothmann, E., Bredt, P., Broggio, A., Buckley, A., Butter, A., Butterworth, J. M., Byrne, E. P., Calame, C. M. C., Chakraborty, S., Chen, X., Chiesa, M., Childers, J. T., Cruz-Martinez, J., Currie, J., Darvishi, N., Dasgupta, M., Denner, A., Dreyer, F. A., Dytman, S., El-Menoufi, B. K., Engel, T., Rvasio, S. F., Figueroa, D., Flower, L., Forshaw, J. R., Frederix, R., Friedland, A., Frixione, S., Gallagher, H., Gallmeister, K., Gardiner, S., Gauld, R., Gaunt, J., Gavardi, A., Gehrmann, T., De Ridder, A. G., Gellersen, L., Giele, W., Gieseke, S., Giuli, F., Glover, E. W. N., Grazzini, M., Grohsjean, A., Gütschow, C., Hamilton, K., Han, T., Hatcher, R., Heinrich, G., Helenius, I., Hen, O., Hirschi, V., Höfer, M., Holguin, J., Huss, A., Ilten, P., Jadach, S., Jentsch, A., Jones, S. P., Ju, W., Kallweit, S., Karlberg, A., Katori, T., Kerner, M., Kilian, W., Kirchgaeßer, M. M., Klein, S., Knobbe, M., Krause, C., Krauss, F., Lang, J., Lang, J. N., Lee, G., Li, S. W., Lim, M. A., Lindert, J. M., Lombardi, D., Lönnblad, L., Löschner, M., Lurkin, N., Ma, Y., Machado, P., Magerya, V., Maier, A., Majer, I., Maltoni, F., Marcoli, M., Marinelli, G., Masouminia, M. R., Mastrolia, P., Mattelaer, O., Mazzitelli, J., McFayden, J., Medves, R., Meininger, P., Mo, J., Monni, P. F., Montagna, G., Morgan, T., Mosel, U., Nachman, B., Nadolsky, P., Nagar, R., Nagy, Z., Napoletano, D., Nason, P., Neumann, T., Nevay, L. J., Nicrosini, O., Niehues, J., Niewczas, K., Ohl, T., Ossola, G., Pandey, V., Papadopoulos, A., Papaefstathiou, A., Paz, G., Pellen, M., Pelliccioli, G., Peraro, T., Piccinini, F., Pickering, L., Pires, J., Placzek, W., Plätzer, S., Plehn, T., Pozzorini, S., Prestel, S., Preuss, C. T., Price, A. C., Quackenbush, S., Re, E., Reichelt, D., Reina, L., Reuschle, C., Richardson, P., Rocco, M., Rocco, N., Roda, M., Garcia, A. R., Roiser, S., Rojo, J., Rottoli, L., Salam, G. P., Schönherr, M., Schuchmann, S., Schumann, S., Schürmann, R., Scyboz, L., Seymour, M. H., Siegert, F., Signer, A., Chahal, G. S., Siódmok, A., Sjöstrand, T., Skands, P., Smillie, J. M., Sobczyk, J. T., Soldin, D., Soper, D. E., Soto-Ontoso, A., Soye, G., Stagnitto, G., Tena-Vidal, J., Tomalak, O., Tramontano, F., Trojanowski, S., Tu, Z., Uccirati, S., Ullrich, T., Ulrich, Y., Uthoff, M., Valassi, A., Verbytskyi, A., Verheyen, R., Wagman, M., Walker, D., Webber, B. R., Weinstein, L., White, O., Whitehead, J., Wiesemann, M., Wilkinson, C., Williams, C., Winterhalder, R., Wret, C., Xie, K., Yang, T. Z., Yazgan, E., Zanderighi, G., Zanolini, S. & Zapp, K., May 2024, In: *SciPost Physics*. 16, 5, 225 p., 130.

Impact of QCD uncertainties on antiproton spectra from dark-matter annihilation

Jueid, A., Kip, J., Ruiz De Austri, R. & Skands, P., 28 Apr 2023, In: *Journal of Cosmology and Astroparticle Physics*. 2023, 4, 14 p., 068.

Computational scientists should consider climate impacts and grant agencies should reward them

Skands, P., Mar 2023, In: *Nature Reviews Physics*. 5, 3, p. 137-138 2 p.

A standard convention for particle-level Monte Carlo event-variation weights

Bothmann, E. (ed.), Buckley, A. (ed.), Gütschow, C. (ed.), Prestel, S. (ed.), Schönherr, M. (ed.), Skands, P. (ed.), Andersen, J. R., Bhattacharya, S., Butterworth, J., Chahal, G. S., Corpe, L., Gellersen, L., Gignac, M., Höche, S., Kar, D., Krauss, F., Kretschmar, J., Lönnblad, L., McFayden, J., Papaefstathiou, A., & 6 others Plätzer, S., Schumann, S., Seymour, M. H., Siegert, F., Siódmok, A. & The MCnet Community, 8 Feb 2023, In: *SciPost Physics Core*. 6, 1, 11 p., 007.

Towards NNLO+PS matching with sector showers

Campbell, J. M., Höche, S., Li, H. T., Preuss, C. T. & Skands, P., 10 Jan 2023, In: *Physics Letters B*. 836, 10 p., 137614.

The role of multi-parton interactions in doubly-heavy hadron production

Egede, U., Hadavizadeh, T., Singla, M., Skands, P. & Vesterinen, M., 1 Sept 2022, In: *European Physical Journal C*. 82, 9, 20 p., 773.

Review of Particle Physics

Particle Data Group, Aug 2022, In: *Progress of Theoretical and Experimental Physics*. 2022, 8, 2270 p., 083C01.

Estimating QCD uncertainties on antiproton spectra from dark-matter annihilation

Jueid, A., Kip, J., de Austri, R. R. & Skands, P., 14 Jul 2022, *Proceedings of Science: 2021 Computational Tools for High Energy Physics and Cosmology, CompTools 2021*. Arbey, A., Belanger, G., Boussejra, A., Desai, N., Gonzalo, T., Harlander, R. & Mahmoudi, N. (eds.). Italy: Sissa Medialab, SRL, Vol. 409. 16 p. 005. (Proceedings of Science).

Interleaved resonance decays and electroweak radiation in the Vincia parton shower
Brooks, H., Skands, P. & Verheyen, R., 22 Mar 2022, In: SciPost Physics. 12, 3, 39 p., 101.

A study of QCD radiation in VBF Higgs production with VINCIA and PYTHIA
Höche, S., Mrenna, S., Payne, S., Preuss, C. T. & Skands, P., 10 Jan 2022, In: SciPost Physics. 12, 1, 31 p., 010.

Particle spectra from dark matter annihilation: Physics modeling and QCD uncertainties
Amoroso, S., Caron, S., Jueid, A., de Austri, R. R. & Skands, P., 10 May 2021, *Proceedings, Tools for High Energy Physics and Cosmology (TOOLS 2020): Lyon, France, November 2-6, 2020*. Italy: Sissa Medialab, SRL, Vol. 392. 14 p. 028. (Proceedings of Science).

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Skands, P. & Verheyen, R., 10 Dec 2020, In: Physics Letters B. 811, 6 p., 135878.

String fragmentation with a time-dependent tension
Hunt-Smith, N. & Skands, P., Nov 2020, In: European Physical Journal C. 80, 11, 13 p., 1073.

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Particle Data Group, Aug 2020, In: Progress of Theoretical and Experimental Physics. 2020, 8, 2093 p., 083C01.

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Duncan, C. B. & Skands, P., May 2020, In: SciPost Physics. 8, 5, 28 p., 080.

Coherent Showers in Decays of Coloured Resonances
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the FCC Collaboration, 1 Jul 2019, In: European Physical Journal Special Topics. 228, 4, p. 755-1107 353 p.

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the FCC Collaboration, 1 Jul 2019, In: European Physical Journal Special Topics. 228, 5, p. 1109-1382 274 p.

FCC Physics Opportunities: Future Circular Collider Conceptual Design Report Volume 1
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Estimating QCD uncertainties in Monte Carlo event generators for gamma-ray dark matter searches
Amoroso, S., Caron, S., Jueid, A., De Austri, R. R. & Skands, P., 7 May 2019, In: Journal of Cosmology and Astroparticle Physics. 2019, 5, 45 p., 007.

Monte Carlo event generators for high energy particle physics event simulation
Buckley, A. (ed.), Krauss, F. (ed.), Platzer, S. (ed.), Seymour, M. H. (ed.), Alioli, S., Andersen, J., Bellm, J., Butterworth, J., Dasgupta, M., Duhr, C., Frixione, S., Gieseke, S., Hamilton, K., Hesketh, G., Hoche, S., Jung, H., Kilian, W., Lonnblad, L., Maltoni, F., Mangano, M. L., & 23 othersMrenna, S., Nagy, Z., Nason, P., Nurse, E., Ohl, T., Oleari, C., Papaefstathiou, A., Plehn, T., Prestel, S., Re, E., Reuter, J., Richardson, P. J., Salam, G., Schonherr, M., Schumann, S., Siegert, F., Siodmok, A., Sjodahl, M., Sjostrand, T., Skands, P., Soper, D., Soyez, G. & Webber, B. R., 5 Feb 2019, *Proceedings*. 7 p.

Average event properties from LHC to FCC-hh

Brooks, H. & Skands, P., 1 Nov 2018, In: European Physical Journal C. 78, 11, 16 p., 963.

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Tanabashi, M., Hagiwara, K., Hikasa, K., Nakamura, K., Sumino, Y., Takahashi, F., Tanaka, J., Agashe, K., Aielli, G., Amsler, C., Antonelli, M., Asner, D. M., Baer, H., Banerjee, S., Barnett, R. M., Basaglia, T., Bauer, C. W., Beatty, J. J., Belousov, V. I., Beringer, J., & 211 others Bethke, S., Bettini, A., Bichsel, H., Biebel, O., Black, K. M., Blucher, E., Buchmuller, O., Burkert, V., Bychkov, M. A., Cahn, R. N., Carena, M., Ceccucci, A., Cerri, A., Chakraborty, D., Chen, M. C., Chivukula, R. S., Cowan, G., Dahl, O., D'Ambrosio, G., Damour, T., De Florian, D., De Gouvêa, A., Degrand, T., De Jong, P., Dissertori, G., Dobrescu, B. A., D'Onofrio, M., Doser, M., Drees, M., Dreiner, H. K., Dwyer, D. A., Eerola, P., Eidelman, S., Ellis, J., Erler, J., Ezhela, V. V., Fetscher, W., Fields, B. D., Firestone, R., Foster, B., Freitas, A., Gallagher, H., Garren, L., Gerber, H. J., Gerbier, G., Gershon, T., Gershtein, Y., Gherghetta, T., Godizov, A. A., Goodman, M., Grab, C., Gribsan, A. V., Grojean, C., Groom, D. E., Grünewald, M., Gurtu, A., Gutsche, T., Haber, H. E., Hanhart, C., Hashimoto, S., Hayato, Y., Hayes, K. G., Hebecker, A., Heinemeyer, S., Heltsley, B., Hernández-Rey, J. J., Hisano, J., Höcker, A., Holder, J., Holtkamp, A., Hyodo, T., Irwin, K. D., Johnson, K. F., Kado, M., Karliner, M., Katz, U. F., Klein, S. R., Klempt, E., Kowalewski, R. V., Krauss, F., Kreps, M., Krusche, B., Kuyanov, Y. V., Kwon, Y., Lahav, O., Laiho, J., Lesgourgues, J., Liddle, A., Ligeti, Z., Lin, C. J., Lippmann, C., Liss, T. M., Littenberg, L., Lugovsky, K. S., Lugovsky, S. B., Lusiani, A., Makida, Y., Maltoni, F., Mannel, T., Manohar, A. V., Marciano, W. J., Martin, A. D., Masoni, A., Matthews, J., Meißner, U. G., Milstead, D., Mitchell, R. E., Mönig, K., Molaro, P., Moortgat, F., Moskovic, M., Murayama, H., Narain, M., Nason, P., Navas, S., Neubert, M., Nevski, P., Nir, Y., Olive, K. A., Pagan Griso, S., Parsons, J., Patrignani, C., Peacock, J. A., Pennington, M., Petcov, S. T., Petrov, V. A., Pianori, E., Piepke, A., Pomarol, A., Quadt, A., Rademacker, J., Raffelt, G., Ratcliff, B. N., Richardson, P., Ringwald, A., Roesler, S., Rolli, S., Romaniouk, A., Rosenberg, L. J., Rosner, J. L., Rybka, G., Ryutin, R. A., Sachrajda, C. T., Sakai, Y., Salam, G. P., Sarkar, S., Sauli, F., Schneider, O., Scholberg, K., Schwartz, A. J., Scott, D., Sharma, V., Sharpe, S. R., Shutt, T., Silari, M., Sjöstrand, T., Skands, P., Skwarnicki, T., Smith, J. G., Smoot, G. F., Spanier, S., Spieler, H., Spiering, C., Stahl, A., Stone, S. L., Sumiyoshi, T., Syphers, M. J., Terashi, K., Terning, J., Thoma, U., Thorne, R. S., Tiator, L., Titov, M., Tkachenko, N. P., Törnqvist, N. A., Tovey, D. R., Valencia, G., Van De Water, R., Varelas, N., Venanzoni, G., Verde, L., Vinciter, M. G., Vogel, P., Vogt, A., Wakely, S. P., Walkowiak, W., Walter, C. W., Wands, D., Ward, D. R., Wascko, M. O., Weiglein, G., Weinberg, D. H., Weinberg, E. J., White, M., Wiencke, L. R., Willocq, S., Wohl, C. G., Womersley, J., Woody, C. L., Workman, R. L., Yao, W. M., Zeller, G. P., Zenin, O. V., Zhu, R. Y., Zhu, S. L., Zimmermann, F., Zyla, P. A., Anderson, J., Fuller, L., Lugovsky, V. S. & Schaffner, P., 17 Aug 2018, In: Physical Review D. 98, 3, 1898 p., 030001.

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On renormalization scale variations in parton showers

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LHC@Home: A BOINC-based volunteer computing infrastructure for physics studies at CERN

Barranco, J., Cai, Y., Cameron, D., Crouch, M., Maria, R. D., Field, L., Giovannozzi, M., Hermes, P., Høimyr, N., Kaltchev, D., Karastathis, N., Luzzi, C., Maclean, E., McIntosh, E., Mereghetti, A., Molson, J., Nosochkov, Y., Pieloni, T., Reid, I. D., Rivkin, L., & 6 others Segal, B., Sjobak, K., Skands, P., Tambasco, C., Veken, F. V. D. & Zacharov, I., 29 Dec 2017, In: Open Engineering. 7, 1, p. 379-393 15 p.

Helicity antenna showers for hadron colliders

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A framework for second-order parton showers

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QCD

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Systematics of quark/gluon tagging

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Review of particle physics

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Probing collective effects in hadronisation with the extremes of the underlying event

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QCD and $\gamma\gamma$ studies at the FCC-ee

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The VINCIA antenna shower for hadron colliders

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The extremes of the underlying event

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Measurement of observables sensitive to coherence effects in hadronic Z decays with the OPAL detector at LEP

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