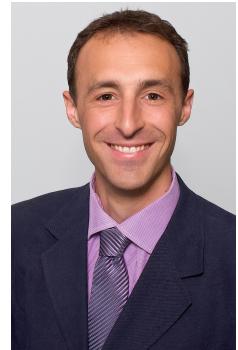# Gionata Luisoni

Physicist

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PERSONAL INFORMATION

Date of Birth	September 2, 1983
Place of Birth	Locarno, Ticino, Switzerland
Nationality	Swiss

EMPLOYMENTS

Oct. 2017 – March 2018 **Postdoctoral position**, *Max Planck Institute for Physics (Werner Heisenberg Institut)*, MPP, München, Germany.
First computation of Higgs boson production with one jet, obtained numerically on HPC clusters and GPUs (Fortran, C++, Python, Cuda). Deep learning specialization and courses on Hadoop, SQL, R and time series analysis on Coursera. Development of a Deep Learning Code (C++, Python, Tensorflow) for the classification of high energy Higgs production processes.

Oct. 2015 – Sep. 2017 **CERN fellow**, *Theory Division*, CERN, Geneva, Switzerland.
Further development of GoSam and more applications, among which also a study for the physics potential of future particle accelerators. Generation and analysis (Python, C++) of large sets of pseudo-data for physics studies.

Sep. 2012 – Sep. 2015 **Postdoctoral position**, *Max Planck Institute for Physics (Werner Heisenberg Institute)*, MPP, München, Germany.
Development of GoSam and its applications to several experimentally relevant calculations and simulations (Fortran, C++, Python). The simulations are based on Monte Carlo integration and on the generation of big pseudo-data samples, which are then analysed and compared with real data measured in the experiments.

Oct. 2010 – Aug. 2012 **Postdoctoral position**, *Institute for Particle Physics Phenomenology (IPPP)*, University of Durham, Durham, UK.
Joined the GoSam Collaboration (https://gosam.hepforge.org). The GoSam Project consists of a team of 8 to 13 people, in which we developed and published the first code (Python, FORM) for the automatic computation of quantum corrections for scattering amplitudes.

Jun. 2010 – Oct. 2010 **Postdoctoral position (bridging)**, *Institute for theoretical Physics*, Universität Zürich, Zürich, Switzerland.
Computation of precise predictions for event-shape observables and their implementation in a C++ code for a new determination of the strong coupling constant through fits (χ^2-minimization) to experimental data.

Education and Advanced Training

2018	**Course on "Excel to MySQL: Analytic Techniques for Business" on Coursera**.
2018	**Course on time series analysis on Coursera**.
2018	**Deep Learning Specialisation on Coursera**, *With Courses on: Neural Networks and Deep Learning, Structuring Machine Learning Projects, Improving Deep Neural Networks: Hyperparameter tuning Regularization and Optimization, Convolutional Neural Networks, Sequence Models.*
2007 – 2010	**Ph.D. Student in Theoretical Particle Physics**, *Institute of Theoretical Physics*, University of Zürich, Zürich.
	PH.D. THESIS "mit Auszeichnung"
title	*Higher Order Corrections to Jet Observables*
description	The thesis is divided into three main topics which consist in:

- analytical computations of phase-space integrals,
- development of a C++ Code for a new determination of the strong coupling constant,
- computation of non-perturbative corrections for an new determination of the strong coupling constant.

2002 – 2007	**Diploma Student in Physics**, *Department of Physics*, ETH, Zürich. Diploma in 2007 (Equivalent to a Master of Science ETH).
1998 – 2002	**Liceo Cantonale**, *Physics and mathematics oriented curriculum*, Locarno. Maturitá in 2002.

Languages

Italian	Fluent (mother tongue)
German	Business fluent in oral and written
English	Business in oral and written
French	Fluent oral knowledge, good written knowledge

Software Knowledge

OS	Microsoft$^{\text{TM}}$ Windows; Linux: OpenSuse and Ubuntu
Programming Languages	Fortran 77/90 (very good knowledge), Python (very good knowledge), C++ (good knowledge), bash (good knowledge)
ML	Tensorflow, Keras (basic knowledge), Scikit (basic knowledge)
Version cont.	SVN, Git (good knowledge)
Database	SQLite (basic knowledge)
Scientific	R, Mathematica$^{\text{TM}}$, FORM, Gnuplot, ROOT, Stella$^{\text{TM}}$
Office	LaTeX, MS Office$^{\text{TM}}$(Word, Exel, PowerPoint)

Further Working Experiences

2007 – now	**Astronomy outreach**, *Organization of observational nights for CAL (Centro Astronomico del Locarnese)*, Locarno, Switzerland.
2008 – 2018	**Supervision of bachelor, master and PhD students**, *Supervision of several students within the research groups or research projects where I was actively involved.*
2003 – 2017	**Lectures and teaching assistance for scholars and students and PhD students**.
2005 – 2016	**Part time job**, *Translation of weather forecasts for Meteonews AG.* Mr. Peter Wick.

Hobbies and Interests

Aeronautics, general physics and astronomy, mountaineering

Additional material: seminars, talks and publications

Invited Seminar and Conference Talks

01.03.18 **Seminar**, *Università di Milano Bicocca*, Milan, Italy.
Finite mass effects in Higgs boson plus jets production .

23.03.17 **ATLAS Seminar**, *CERN*, Geneva, Switzerland.
An Introduction to Powheg.

17.02.17 **Tutorial**, *Università degli Studi di Padova*, Padova, Italy.
GoSam: a tutorial. Automating 1-loop and NLO calculations.

16.02.17 **Pheno Seminar**, *Università degli Studi di Padova*, Padova, Italy.
Higgs boson production in association with jets: NLO corrections vs mass effects.

30.01.17 **Theory Seminar**, *Max-Planck Institute für Physics*, München, Germany.
Higgs boson production in association with jets: NLO corrections vs mass effects.

12.01.17 **Teilchenphysik Seminar**, *Technische Universität München*, Garching, Germany.
Higgs boson production in association with jets: NLO corrections vs mass effects.

07.10.16 **Particle and Astro-Particle Physics Seminars** , *CERN*, Geneva, Switzerland.
Higgs boson production in association with jets: NLO corrections vs mass effects.

03.12.15 **Kolloquium über Teilchenphysik**, *Karlsruher Institut für Technologie (KIT*, Karlsruhe, Germany.
Higgs boson production in association with jets.

19.05.14 **High Energy Physics Seminars**, *Northwestern University*, Evanston, IL, USA.
Higgs plus light/heavy jets production at NLO with GoSam.

27.02.13 **Seminaire hadronique et des particules**, *CEA*, Saclay, France.
Thrust Distribution at NNLL+NNLO and a new determination of the strong coupling constant.

29.11.12 **Physics Seminar**, *City University New York*, Brooklyn, NY, USA.
What do Experimentalists at LHC Want from the Theorists.

15.06.12 **Particle Physics Seminar**, *University of Southampton*, Southampton, UK.
Automated NLO calculations with GoSam.

24.04.12 **Joint DAMPT-Cavendish HEP Phenomenology Seminar**, *Cavendish Laboratory*, Cambridge, UK.
Automatic NLO calculations with GoSam.

16.02.12 **Particle Physics Seminar**, *University of Manchester*, Manchester, UK.
Automatic NLO calculations with GoSam.

16.01.12 **Particle Physics Seminar**, *Max-Planck Institute for Physics*, Munich, Germany.
Resummation of the Thrust Distribution in the Dijet Region and QCD precision studies.

24.06.11 **IPPP Internal Seminar**, *University of Durham*, Durham, UK.
Two loops Soft Corrections and Resummation of the Thrust distribution in the Dijet Region.

17.06.11 **IPPP Internal Seminar**, *University of Durham*, Durham, UK.
All you ever wanted to know about "Resummation" but never dared to ask.

01.12.10 **Physics Seminar**, *University of Liverpool*, Liverpool, UK.
Determining the Strong Coupling Constant at NNLO from Jet Observables.

15.10.10 **IPPP**, *University of Durham*, Durham, UK.
Higher Order Corrections to Jet Observables.

10.09.17 **TOOLS17**, *Corfu Summer Institute*, Corfu, GR.
N(N)LO calculations.

04.04.17 **DIS17**, *University of Birmingham*, Birmingham, UK.
Spin polarization in top pair production in association with two photons at NLO+PS.

04.04.17 **DIS17**, *University of Birmingham*, Birmingham, UK.
Finite mass effects in Higgs and double Higgs production.

19.01.16 **Rencontres de Blois 2016**, *Château Royal de Blois*, Blois, France.
Higgs + 3 jets production in NLO QCD.

19.01.16 **International workshop on Advanced Computing and Analysis Techniques in physics research (ACAT)**, *Universidad Técnica Federico Santa María*, Valparaíso, Chile.
Higgs boson production in association with jets in gluon-gluon fusion.

06.01.16 **The Zurich Phenomenology Workshop**, *ETHZ*, Zürich, Switzerland.
Higgs boson production in association with jets in gluon-gluon fusion.

09.10.15 **QCD, EW and tools at 100 TeV**, *CERN*, Geneva, Switzerland.
NLO H+jets in gluon gluon fusion.

07.10.15 **QCD, EW and tools at 100 TeV**, *CERN*, Geneva, Switzerland.
NLO+PS Wbb and Wbbj at 100 TeV.

02.09.15 **LHCP2015**, *Hotel Corinthia*, St.Petersburg, Russia.
Higher order calculations: status and prospects.

24.06.15 **LHC Higgs XS VBF+VH Subgroup Meeting**, *CERN*, Geneva, Switzerland.
Distinguishing VBF from gluon-gluon fusion.

06.01.15 **NLO Users-of-Sherpa Meeting**, *University of Zurich*, Zürich, Switzerland.
GoSam+Sherpa user experiences.

09.12.14 **Higgs+Jets Workshop**, *IPPP*, Durham, UK.
Higgs plus 3 jets in ggf at NLO.

21.10.14 **LHC Higgs XS VBF+VH Subgroup Meeting**, *CERN*, Geneva, Switzerland.
Gluon fusion in H+3j as a background to VBF.

03-05.09.14 **HP2.5**, *Acetri*, Florence, Italy.
NLO Higgs phenomenology with GoSam.

18.07.14 **LHC Higgs XS WG2: extension of k-framework**, *CERN*, Geneva, Switzerland.
gg→HZ in the POWHEG-BOX-V2 with coupling variation.

12-16.05.14 **American Workshop on Linear Colliders**, *Fermilab*, Batavia, IL, USA.
Status and prospects of α_s determination at e^+e^- colliders.

19-21-01.14 **MPI Retreat**, *Hotel zur Post*, Bayrischzell, Germany.
Higgs phenomenology (@ MPI Pheno Group).

15.01.14 **ATLAS-Sherpa Top Physics WS**, *MPI*, München, Germany.
Higgs associated top quark pair production (including an extra jet).

10.01.14 **NLO Users-of-Sherpa Meeting**, *MPI*, München, Germany.
Recent developments in GoSam.

08-10.01.14 **The Zurich Phenomenology Workshop**, *ETHZ*, Zürich, Switzerland.
Recent developments in GoSam.

16-17.12.13 **ATLAS Higgs WG (N)NLO MC and Tools WS**, *CERN*, Geneva, Switzerland.
Higgs + jets in gluon fusion with GoSam.

11-15.11.13 **LCWS13**, *University of Tokyo*, Tokyo, Japan.
Review of α_s determinations from e^+e^- annihilation.

22-27.09.13 **Radcor13**, *Lumley Castle*, Chester-le-Street, UK.
Interfacing GoSam with Monte Carlo event generators.

28.04-
03.05.13 **Amplitudes 2013**, *Ringberg Castle*, Kreuth, Germany.
GoSam: automated multi-process scattering amplitudes at one loop.

09-16.03.13 **Rencontre de Moriond**, *La Thuile*, Aosta Valley, Italy.
NLO calculations with GoSam.

04-08.03.13 **Tagung der Deutsche Physikalische Gesellschaft**, *TU Dresden*, Dresden, Germany.
Automatic NLO calculations with GoSam.

19-21.11.12 **ATLAS-CMS-LPCC MC generators and future challenges workshop**, *CERN*, Geneva, Switzerland.
Automatic NLO calculations with GoSam.

01-12.10.12 **TH/LPCC Institute on SM at the LHC**, *CERN*, Geneva, Switzerland.
Automatic NLO calculations with GoSam via BLHA.

04-07.09.12 **HP2.4**, *Max-Planck Institute for Physics*, Munich, Germany.
Automated NLO calculations with GoSam.

19-22.03.12 **LHCPhenoNet workshop**, *Lumley Castle*, Chester-le-Street, UK.
Automatic NLO calculations with GoSam.

14-17.09.10 **HP2.3**, *Acetri*, Florence, Italy.
NNLO Antenna Subtraction with One Hadronic Initial State.

19-23.04.10 **DIS10**, *Convitto della Calza*, Florence, Italy.
NNLO Antenna Subtraction with One Hadronic Initial State, and
Determining α_s at NNLO from Event-Shape Data.

25-30.10.09 **Radcor09**, *Monte Verità*, Ascona, Switzerland.
NNLO Antenna Subtraction with One Hadronic Initial State.

21-24.09.09 **LC09**, *Università degli Studi di Perugia*, Perugia, Italy.
Event Shapes at NLLA+NNLO and a New Determination of α_s.

04-05.06.09 **Ph.D. Students Seminar in Particle Physics**, *ETH*, Zürich, Switzerland.
NNLO Antenna Subtraction with Hadronic Initial States.

16-20.11.08 **ILC08 & LCWS08**, *University of Illinois*, Chicago, USA.
Event Shapes at NLLA+NNLO.

29.07-
05.08.08 **ICHEP08**, *University of Pennsylvania*, Philadelphia, USA.
Matching of Resummed NLLA with Fixed NNLO for Event Shapes.

26-30.05.08 **HERA and LHC workshop**, *CERN*, Geneva, Switzerland.
Event Shapes at NLLA+NNLO.

07-11.04.08 **DIS08**, *University College London*, London, UK.
Matching of Fixed Order and Resummed Calculations for Event Shapes.

26-27.03.08 **SPS Jahrestagung 08**, *University of Geneva*, Geneva, Switzerland.
Matching of Fixed Order and Resummed Calculations for Event Shapes.

13-14.09.07 **Ph.D. Students Seminar in Particle Physics**, *ETH*, Zürich, Switzerland.
Matching of Fixed Order and Resummed Calculations in pQCD.

PUBLICATIONS

Journal
Papers

- S. Jones, M. Kerner, G. Luisoni, *NLO QCD corrections to Higgs boson plus jet production with full top-quark mass dependence*, Phys. Rev. Lett. **120** (2018) 162001, arXiv:1802.00349 [OA].

- F. Caola, G. Luisoni, K. Melnikov, R. Röntsch, *NNLO QCD corrections to associated WH production and $H \to b\bar{b}$ decay*, Phys. Rev. D **97** (2017) 074022, arXiv:1712.06954 [OA].

- G. Heinrich, S. Jones, M. Kerner, G. Luisoni, E. Vryonidou, *NLO predictions for Higgs boson pair production with full top quark mass dependence matched to parton showers*, JHEP **1**708 (2017) 088, arXiv:1703.09252 [OA].

- S. Alioli, F. Caola, G. Luisoni, R. Rontsch, *ZZ production in gluon fusion at NLO matched to parton shower*, Phys. Rev. D **95** (2017) 3, arXiv:1609.09719 [OA].

- N. Greiner, S. Hoeche, G. Luisoni, M. Schonherr, J.C. Winter, *Full mass dependence in Higgs boson production in association with jets at the LHC and FCC*, JHEP **1**701 (2017) 091, arXiv:1608.01195 [OA].

- H. van Deurzen, R. Frederix, V. Hirschi, G. Luisoni, P. Mastrolia, G. Ossola, *Spin Polarisation of $t\bar{t}\gamma\gamma$ production at NLO+PS with GoSam interfaced to MadGraph5_aMC@NLO*, Eur. Phys. J. C **76** (2016) 4, 221, arXiv:1509.02077 [OA].

- N. Greiner, S. Hoeche, G. Luisoni, M. Schonherr, J.C. Winter, Y. Yundin, *Phenomenological analysis of Higgs boson production through gluon fusion in association with jets*, JHEP **1**601 (2016) 169, arXiv:1506.01016 [OA].

- G. Luisoni, S. Marzani, *QCD resummation for hadronic final states*, J. Phys. G **42** (2015) 10, 103101, arXiv:1505.04084 [OA].

- G. Luisoni, C. Oleari, F. Tramontano, *$Wb\bar{b}j$ production at NLO with POWHEG+MiNLO*, JHEP **1504** (2015) 161, arXiv:1502.01213 [OA].

- G. Cullen, H. van Deurzen, N. Greiner, G. Heinrich, G. Luisoni, P. Mastrolia, E. Mirabella, G. Ossola and T. Peraro, J. Schlenk, J. F. von Soden-Fraunhofen and F. Tramontano, *GoSam-2.0: a tool for automated one-loop calculations within the Standard Model and beyond*, Eur. Phys. J. C **74** (2014) 8 , 3001, arXiv:1404.7096 [OA].

- H. van Deurzen, G. Luisoni, P. Mastrolia, E. Mirabella, G. Ossola and T. Peraro, *Multi-leg One-loop Massive Amplitudes from Integrand Reduction via Laurent Expansion*, JHEP **1403** (2014) 115, arXiv:1312.6678 [OA].

- S. Alioli *et al.*, *Update of the Binoth Les Houches Accord for a standard interface between Monte Carlo tools and one-loop programs*, Comput. Phys. Commun. **185** (2014) 560, arXiv:1308.3462 [OA].

- H. van Deurzen, G. Luisoni, P. Mastrolia, E. Mirabella, G. Ossola and T. Peraro, *NLO QCD corrections to Higgs boson production in association with a top quark pair and a jet*, Phys. Rev. Lett. **111** (2013) 171801, arXiv:1307.8437 [OA].

- G. Cullen, H. van Deurzen, N. Greiner, G. Luisoni, P. Mastrolia, E. Mirabella, G. Ossola, T. Peraro and F. Tramontano, *NLO QCD corrections to Higgs boson production plus three jets in gluon fusion*, Phys. Rev. Lett. **111** (2013) 131801, arXiv:1307.4737 [OA].

- S. Hoeche, J. Huang, G. Luisoni, M. Schoenherr and J. Winter, *Zero and one jet combined next-to-leading order analysis of the top quark forward-backward asymmetry*, Phys. Rev. D **88** (2013) 1, arXiv:1306.2703 [OA].

- G. Luisoni, P. Nason, C. Oleari and F. Tramontano, *$HW^{\pm}/HZ + 0$ and 1 jet at NLO with the POWHEG BOX interfaced to GoSam and their merging within MiNLO*, JHEP **1310** (2013) 083, arXiv:1306.2542 [OA].

- H. van Deurzen, N. Greiner, G. Luisoni, P. Mastrolia, E. Mirabella, G. Ossola, T. Peraro, J. F. von Soden-Fraunhofen and F. Tramontano, *NLO QCD corrections to the production of Higgs plus two jets at the LHC*, Phys. Lett. B **721** (2013) 74, arXiv:1301.0493 [OA].

- T. Gehrmann, G. Luisoni, P. F. Monni, *Power corrections in the dispersive model for a determination of the strong coupling constant from the thrust distribution*, Eur. Phys. J. C **73** (2013) 2265, arXiv:1210.6945 [OA].

- G. Cullen, N. Greiner, G. Heinrich, G. Luisoni, P. Mastrolia, G. Ossola, T. Reiter, F. Tramontano, *Automated One-Loop Calculations with GoSam*, Eur. Phys. J. C **72** (2012) 1889, arXiv:1111.2034 [OA].

- P.F. Monni, T. Gehrmann and G. Luisoni, *Two-Loop Soft Corrections and Resummation of the Thrust Distribution in the Dijet Region*, JHEP **1108** (2011) 010, arXiv:1105.4560 [OA].

- A. Daleo, A. D. Ridder, T. Gehrmann and G. Luisoni, *Antenna subtraction at NNLO with hadronic initial states: initial-final configurations*, JHEP **1001** (2010) 118, arXiv:0912.0374 [OA].

- T. Gehrmann, M. Jaquier and G. Luisoni, *Hadronization effects in event shape moments*, Eur. Phys. J. C **67** (2010) 57, arXiv:0911.2422 [OA].

- G. Dissertori, A. Gehrmann-De Ridder, T. Gehrmann, E. W. N. Glover, G. Heinrich, G. Luisoni and H. Stenzel, *Determination of the strong coupling constant using matched NNLO+NLLA predictions for hadronic event shapes in e+e- annihilations*, JHEP **0908** (2009) 036, arXiv:0906.3436 [OA].
- T. Gehrmann, G. Luisoni and H. Stenzel, *Matching NLLA+NNLO for event shape distributions*, Phys. Lett. B **664** (2008) 265, arXiv:0803.0695 [OA].

Reports

- M.L. Mangano *et al.*, *Physics at a 100 TeV pp collider: Standard Model processes*, arXiv:1607.01831 [OA].
- R. Contino *et al.*, *Physics at a 100 TeV pp collider: Higgs and EW symmetry breaking studies*, arXiv:1606.09408 [OA].
- S. Heinemeyer *et al.* [LHC Higgs Cross Section Working Group Collaboration], *Handbook of LHC Higgs Cross Sections: 3. Higgs Properties*, arXiv:1307.1347 [OA].

Proceedings

- J. Andersen *et al.*, *A comparative study of Higgs boson plus jet production in gluon fusion*, Contribution to "Les Houches 2015: Physics at TeV Colliders: Standard Model Working Group Report", Les Houches, arXiv:1605.04692 [OA].
- G. Luisoni, S. Poslavsky and Y. Schröder, *Track 3: Computations in theoretical physics - techniques and methods*, Track 3 session summary of the ACAT2016 conference, Valparaíso, arXiv:1604.03370 [OA].
- G. Cullen, H. van Deurzen, N. Greiner, J. Huston, G. Luisoni, P. Mastrolia, E. Mirabella, G. Ossola, T. Peraro, F. Tramontano, J. Winter and V. Yundin, *Higgs boson plus di- and tri-jet production at NLO in QCD*, Contribution to "Les Houches 2013: Physics at TeV Colliders: Standard Model Working Group Report", Les Houches, arXiv:1405.1067 [OA].
- G. Luisoni, *Interfacing GoSam with Monte Carlo Event Generators*, Talk given at RADCOR 2013, Chester-le-Street, Lumley Castle, PoS RADCOR **2013** (2014) 027, arXiv:1312.1633 [OA].
- G. Luisoni, *NLO calculations with GoSam*, Talk given at the 48th Rencontres de Moriond on QCD and High Energy Interactions, 9-16 Mar 2013, La Thuile, Italy, arXiv:1312.1633 [OA].
- G. Dissertori, A. Gehrmann-De Ridder, T. Gehrmann, E. W. N. Glover, G. Heinrich, M. Jaquier, G. Luisoni and H. Stenzel, *Determination of the strong coupling constant based on event shapes*, Proceedings of the LC09 WS, Nuovo Cim. C **033N2** (2010) 67 [OA].
- G. Luisoni, *Determining α_s at NNLO from Event-Shape Data*, Talk given at DIS 2010, Florence, PoSDIS **2010** (2010) 121, arXiv:1007.2384 [OA].
- A. Daleo, A. D. Ridder, T. Gehrmann and G. Luisoni, *NNLO Antenna Subtraction with One Hadronic Initial State*, Talk given at DIS 2010, Florence, PoSDIS **2010** (2010) 122 [OA].
- A. Daleo, A. D. Ridder, T. Gehrmann and G. Luisoni, *NNLO Antenna Subtraction with One Hadronic Initial State*, Talk given at RADCOR 2009, Ascona, CSF, PoSRADCOR **2009** (2010) 062, arXiv:1001.2397 [OA].
- H. Jung et al., *Proceedings of the workshop: HERA and the LHC workshop series on the implications of HERA for LHC physics*, arXiv:0903.3861 [OA].
- G. Luisoni, *Event Shape Variables at NLLA+NNLO*, Appeared in the proceedings of International Linear Collider Workshop (LCWS08 and ILC08), Chicago, Illinois, 16-20 Nov 2008, arXiv:0901.3953 [OA].
- T. Gehrmann, G. Luisoni and H. Stenzel, *Matching of Resummed NLLA with Fixed NNLO for Event Shapes*, Talk given at 34th International Conference on High Energy Physics (ICHEP 2008), Philadelphia, Pennsylvania, 30 Jul - 5 Aug 2008, arXiv:0810.3599 [OA].
- G. Luisoni, T. Gehrmann and H. Stenzel, *Matching of resummation with fixed order NNLO for event shapes*, Prepared for 16th International Workshop on Deep Inelastic Scattering and Related Subjects (DIS 2008), London, England, 7-11 Apr 2008.