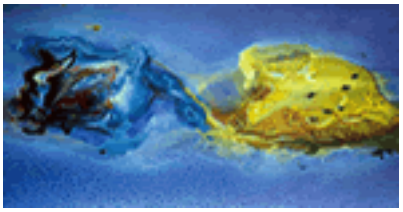
XIIIth Quark Confinement and the Hadron Spectrum



Tuesday, July 31, 2018 - Monday, August 6, 2018

Maynooth University

Scientific Program

Confirmed plenary speakers
Andrei Alexandru (George Washington U) - "*Deep learning beyond Lefschetz thimbles: real time dynamics and the sign problem*"
Lily Asquith (Sussex) - "*Advances in machine learning and applications to QCD*"
Alexei Bazavov (Michigan State) - "*Status of QCD at nonzero temperature*"
Andrzej Buras (TU Munich) - "*Dual QCD and Kaon Flavour Physics*"
Maxim Chernodub (Tours) - "*Nonperturbative Casimir Effects*"
Hee Sok Chung (TU Munich) - "*Review of quarkonium production: status and prospects*"
Keith Dienes (Arizona) - "*Dark matter from strongly coupled dark sectors*"
Manjit Dosanjh (CERN) - public lecture "*Ions for Cancer Therapy*"
Stefan Flörchinger (Heidelberg) - "*Quantum information and strongly interacting theories*"
Yiota Foka (GSI) - "*Review of experimental results from heavy-ion collisions*"
Max Hansen (CERN) - "*Status of the treatment of multihadron states: theory and applications*"
André Hoang (Vienna) -"*Determinations of α_s from SCET*"
Xiangdong Ji (Shanghai) - "*Parton and quasi-parton distribution functions: EFT description and lattice*"
Masakiyo Kitazawa (Osaka) - "*Exploring non-abelian gauge theory with energy-momentum tensor; stress, thermodynamics and correlations*"
Ayşe Kızılersü (Adelaide) = "*Mike Pennington - an appreciation*"
Bernd Kniehl (Hamburg) - "*Atmospheric charm, QCD and neutrino astronomy*"
Javad Komijani (Glasgow) - "*Mass definition in QCD and mass extraction*"
Jorge Martin Camalich (CERN) - "*The shape of new physics in B-meson decays*"
Ryan Mitchell (Indiana) - "*Experimental Aspects of Heavy Quark Exotica*"
Sven-Olaf Moch (Hamburg) - "*α_s from high-energy collider data*"
Katharina Müller (Zurich) - "*Recent QCD and electroweak results from LHC*"
Amy Nicholson (North Carolina, Chapel Hill) - "*Double beta decay, low energy hadron physics, neutron EDM: results from Lattice QCD*"
Jan Pawlowski (Heidelberg) - "*Applications of the functional renormalisation group*"
Peter Petreczky (BNL) - "*Determinations of α_s from lattice and EFT*"
Alberto Ramos (Trinity College Dublin) - "Lattice calculations of α_s"
Luciano Rezzolla (Frankfurt) -"*Consequences of neutron star mergers for constraining the QCD equation of state*"
Alexander Rothkopf (Stavanger) - "*Bayesian techniques and applications to QCD*"
Franck Sabatie (CEA Saclay) - "*GPDs and nucleon tomography*"
Hagop Sazdjian (Orsay) - "*Large N_c QCD and tetraquarks*"
Igor Shovkovy (Arizona) - "*Anomalous chiral matter: from QCD to condensed matter*"
Iain Stewart (MIT) - "*SCET and jets in QCD*"
Kalman Szabo (Wuppertal) - "*The mass of the QCD axion*"
John Terning (UC Davis) -"*SUSY and Confinement*"
Roundtable discussions
What can neutron star and heavy ion physics learn from each other?
David Blaschke (chair), Mark Alford, Pawel Danielewicz, Thomas Klähn, Ingo Tews, Aleksi Vuorinen
Determining the strong coupling - status and challenges

Antonio Pich (chair), Juan Rojo, Rainer Sommer, Antonio Vairo
Axion physics: status, prospects and challenges

Paolo Di Vecchia (chair), Maurizio Gianotti, Massimiliano Lattanzi, Axel Lindner, Guido Martinelli

A: Vacuum structure and confinement

Mechanisms of quark confinement (vortices, monopoles, calorons...) and the structure of the vacuum in non-Abelian gauge theories. Chiral symmetry breaking, and the Dirac spectrum in the low-momentum region. Studies of ghost and gluon propagators. Confining strings and flux tubes, their effective actions. Renormalons and power corrections. Interface between perturbative and nonperturbative physics.

Conveners: D. Antonov (Heidelberg), M. Faber (TU Vienna), J. Greensite (San Francisco State U)

Focus Subsection: Emergent Gauge Fields and Chiral Fermions

Chiral fermions and anomalous hydrodynamic effects in condensed matter systems, quantum simulators of QCD, topological phenomena in condensed matter systems.

Conveners: F. Assaad (Würzburg U.), A. Bazavov (Michigan State U.), T. Schaefer (NC State U), V. Shevchenko (NRC Kurchatov I.)

B: Light quarks

Chiral and soft collinear effective theories; sum rules; lattice calculations; Schwinger-Dyson equations; masses of light quarks; light-quark loops; phenomenology of light-hadron form factors, spectra and decays; structure functions and generalized parton distributions; exotics and glueballs; experiments.

Conveners: J. Goity (Hampton U.), B. Ketzer (Bonn U.), V. Lubicz (U. Roma 3) H. Sazdjian (IPN Orsay), N. G. Stefanis (Ruhr U. Bochum)

C: Heavy quarks

Heavy-light mesons, heavy quarkonia, heavy baryons, heavy exotics and related topics: phenomenology of spectra, decays, and production; effective theories for heavy quarks (HQET, NRQCD, pNRQCD, vNRQCD, SCET); sum rules for heavy hadrons; lattice calculations of heavy hadrons; heavy-quark mass determinations; experiments.

Conveners: G. Bodwin (Argonne NL), P. Pakhlov (ITEP, Moscow), J. Soto (U. Barcelona), A. Vairo (TU Munich)

D: Deconfinement

QCD at finite temperature; quark-gluon plasma detection and characteristics; jet quenching; transport coefficients; lattice QCD and phases of quark matter; QCD vacuum and strong fields; heavy-ion experiments.

Conveners: P. Foka (GSI), E. Iancu (CEA/DSM/Saclay), P. Petreczky (BNL), A. Vuorinen (U.

Helsinki)

E: QCD and New Physics

Physics beyond the Standard Model from hadronic physics, including precision experimental data and precision calculations.

Conveners: W. Detmold (MIT), M. Gersabeck (U. Manchester), F. J. Llanes-Estrada (UC Madrid), E. Mereghetti (LANL), J. Portoles (IFIC, Valencia)

F: Nuclear and Astroparticle Physics

Nuclear matter; nuclear forces; quark matter; neutron and compact stars.

Conveners: M. Alford (Washington U. St.Louis), D. Blaschke (U. Wroclaw), T. Cohen (U. Maryland), J. Marton (SMI Vienna), A. Schmitt (U Southampton)

G: Strongly Coupled Theories

Hints on the confinement/deconfinement mechanisms from supersymmetric and string theories; strongly coupled theories beyond the Standard Model; applications of nonperturbative methods of QCD to other fields.

Conveners: T. Appelquist (Yale), D. Espriu (U. Barcelona), Z. Fodor (U. Wuppertal), G. Kribs (Oregon U.), F. Sannino (U. Southern Denmark)

H. Statistical Methods for Physics Analysis in the XXI Century

Machine learning techniques; data fitting and extraction of signals; new developments in unfolding methods; averaging and combination of results.

Conveners: T. Dorigo (U. Padova), S.V. Gleyzer (CERN)