

FOM node



Stan Bentvelsen
on behalf of the FOM - node
April 3, 2014



UNIVERSITEIT VAN AMSTERDAM



Radboud Universiteit Nijmegen

UCL
Université
catholique
de Louvain



FOM - Nikhef

- FOM
 - „Fundamental Research of Matter” in Netherlands
 - **Nikhef**: one of its institutes
 - **Amolf**: molecular and material science
 - **Differ**: fusion energy and solar fuels
- Nikhef
 - National institute of subatomic physics
 - Partnership with four universities
 - **University of Amsterdam - Nijmegen University**
 - ATLAS + theory
 - **Utrecht and VU university**
 - ALICE + LHCb
- UCL Louvain - partner
 - Institut de recherche en mathématique et physique

***Higgstools node
embedded in University of
Amsterdam, Nijmegen and
Louvain***

Introducing Nikhef

- Nikhef institute
 - Accelerator physics and astroparticle physics
 - LHC - ATLAS, ALICE, LHCb
 - Virgo - KM3NeT - Auger
 - ~200 physicists, of which 60 tenured
 - 70% based in Amsterdam, remaining Utrecht and Nijmegen
 - Computing centre
 - Nikhef+SARA one of 12 Tier-1 in ATLAS
 - active research center providing an excellent training environment for young researchers and a wide range of topical graduate courses and colloquia.

Our FOM node

- Theory Nikhef - Nijmegen
 - Central role in phenomenological research in NL
 - hosting monthly meetings and workshops
 - fostering cross-institute collaborations.
- ATLAS - experimental group
 - One of (larger) institutes in ATLAS
 - PhD's member of the Research School for Subatomic Physics -
- The CP3 center in Louvain
 - Hosting of DELPHES
 - Efficient training environment for young researchers with many visiting PhD students
 - part of the Belgian Network on Fundamental Interactions (Inter University Attraction Pole).

Our FOM node - people

- Team

- experimentalists and theoreticians from Nikhef, the Radboud University Nijmegen, and the Université Catholique de Louvain



Jos Vermaseren	TH
Eric Laenen	TH
Stan Bentvelsen	ATLAS
Pamela Ferrari	ATLAS
Marcel Vreeswijk	ATLAS
Fabio Maltoni	TH
Ronald Kleiss	TH
Wim Beenakker	TH

Expertise of the note - *experiment*

- Beyond the Standard Model
 - SUSY: inclusive jets, 3rd generation squarks (de Jong)
 - General search for deviations from SM (Igonkina, Caron)
 - Lepton flavour violation in tau decays
 - New phenomena in 3 lepton final states
 - Dark matter searches (Berge)
 - Single top-quark helicity (Vreeswijk)
- Higgs physics
 - $H \rightarrow WW$, $H \rightarrow ZZ$ to leptons (van Vulpen, Kluit, Bentvelsen)
 - spin/parity (Filthaut)
 - ttH production (de Groot, Ferrari)
 - Higgs couplings (Verkerke)
 - overall fit - ATLAS-CMS



Expertise of the note - *theory*

- Development advanced tools for higher order QCD and Electroweak corrections
 - Computer algebra (FORM)
 - Symbolic manipulation system
 - Event generation (MadGraph, aMC@NLO, CamGen)
 - Full automatic NLO event generation
 - Higgs and top quark physics
 - Calculations higher order processes, resummation

Collaboration with other nodes

- Theory:
 - Durham, ETH, Torino, CERN
 - close collaboration of team members
 - WP2, WP3
- Experiment:
 - CERN, Freiburg, ...
 - close collaborations in working group
 - WP2, WP1
 - interpretation of experimental results

Links with activities outside the node

- Experiment and theory
 - Collaborations
 - Manchester, Torino, Edinburgh, Glasgow, Hamburg, Liverpool, Athens, ...
 - Other organizations
 - Dutch research school theoretical physics, Delta ITP
 - Dutch School for subatomic physics
 - BND school, topical lectures, colloquia
 - Grid Tier-1 computing centre
- GRAPPA -
 - centre at University of Amsterdam on Dark Matter
- Active outreach -
 - High schools - presentations - TV - Higgs documentary