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Nordic Nuclear Theory in Retrospect

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Outline

The history of nuclear theory in the Nordic* countries largely follows the history of the Niels Bohr Institute and NORDITA

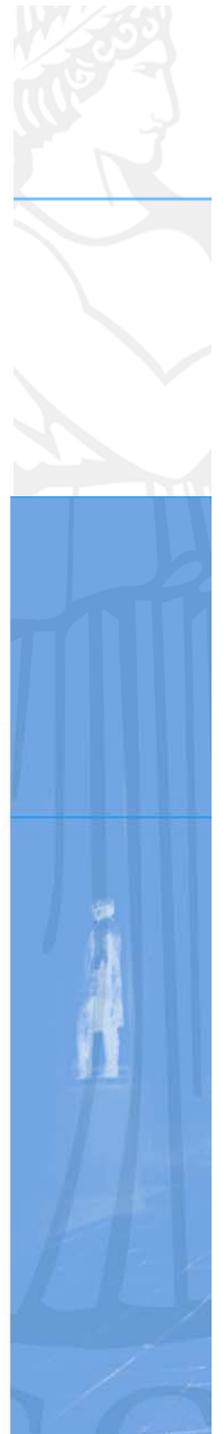
- 1. Pre-NORDITA developments*
- 2. The early years*
- 3. Maturing years and new challenges*
- 4. Nuclear theory departing from NORDITA*
- 5. Other initiatives inspired by NORDITA*
- 6. Is there a future for nuclear theory?*

*emphasis on Norwegian case



1. Pre-NORDITA developments

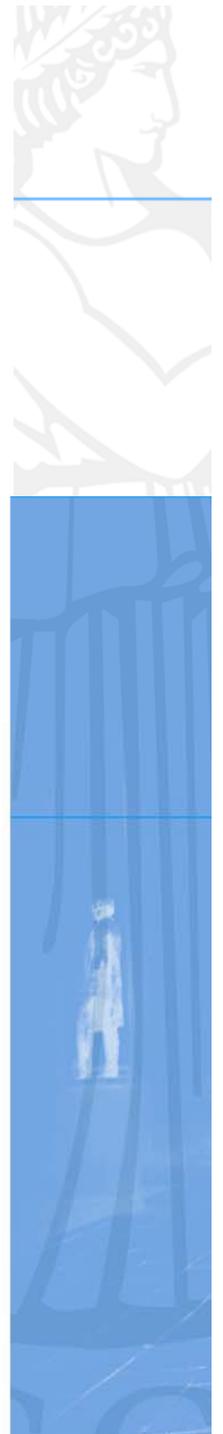
- Denmark was already in a unique position internationally
The other Nordic countries were much less developed
- Norway had experimental facilities, but very little theory
 - Harald Wergeland's doctoral thesis: «Om atomkjernenes struktur» (1942)
 - Egil Hylleraas with a number of popular articles
 - Steingrim Skavlem on scattering theory
- After World War 2 discussions started in the Nordic countries to make common efforts in nuclear physics research, with a sideview to develop nuclear technology





1. Pre-NORDITA developments (2)

- Then came CERN. When the location of CERN to Geneva was decided, a CERN Theory Study Group was established in Copenhagen under the leadership of Niels Bohr
- Two Norwegian stipendiates were Erik Eriksen and Ivar Espe from Oslo; Espe e.g. applying the unified model to the structure of ^{19}F
- After the CERN Theory Group eventually moved to Geneva, one recovered the dormant plans of a Nordic Theory Institute in Copenhagen
- The process was slowed down by Norway's hesitance to make a separate institute, but finally Nordic Institute for Theoretical Atomic Physics was established from 1 October 1957

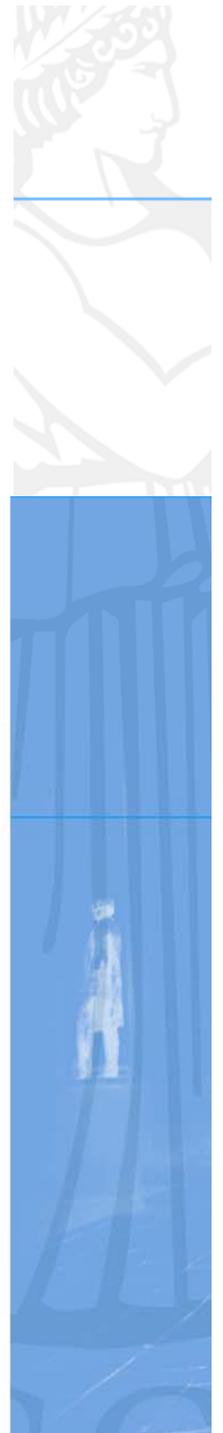




2. The Early Years

- **Personnel**

- *Board*: Niels Bohr (chair) and Nordic theory professors (~15)
- *Scientific staff*: Gunnar Källén, Ben R. Mottelson, Christian Møller (director), Leon Rosenfeld, Stefan Rozenthal;
somewhat later: Gerald E. Brown, James Hamilton, Bengt Strømgren
- *Stipendiates*: ~10 the first two years, increased to ~15
First Norwegian stipendiates: Finn Bakke and Johannes Matihias Hansteen

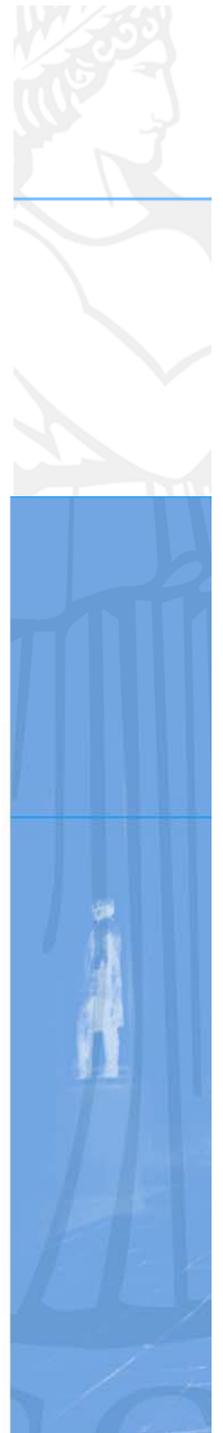




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One of the first Board meetings of NORDITA

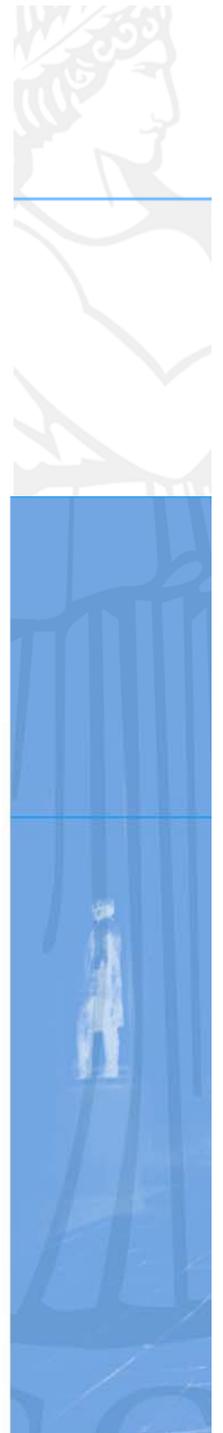




2. The Early Years (2)

- **Programme**

- *Research*: Nuclear physics and elementary particle physics, gradually extended to astrophysics and condensed matter physics
- *Education*: Lecture series, meetings, summer schools
- *Visitors' program*:
Visiting professors and researchers to Nordita and universities in Nordic countries

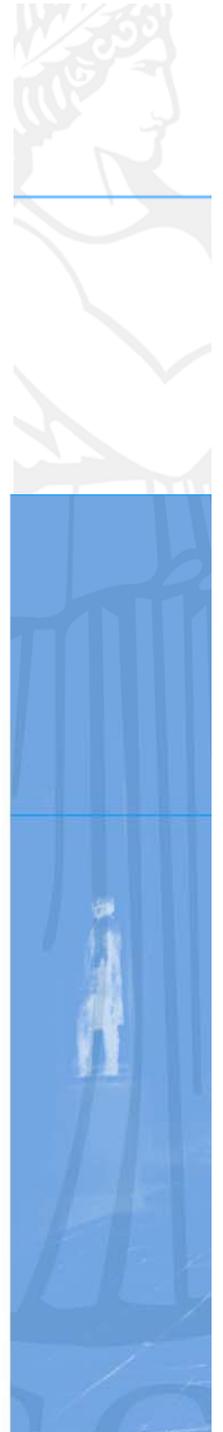




2. The Early Years (3)

- **Characteristics**

- *Cost-effective due to 'symbiosis' with the Niels Bohr Institute*
- *Flexible and non-bureaucratic*
- *Instrumental in building up theoretical physics at Nordic universities*
- *Gateway to 'the world'*

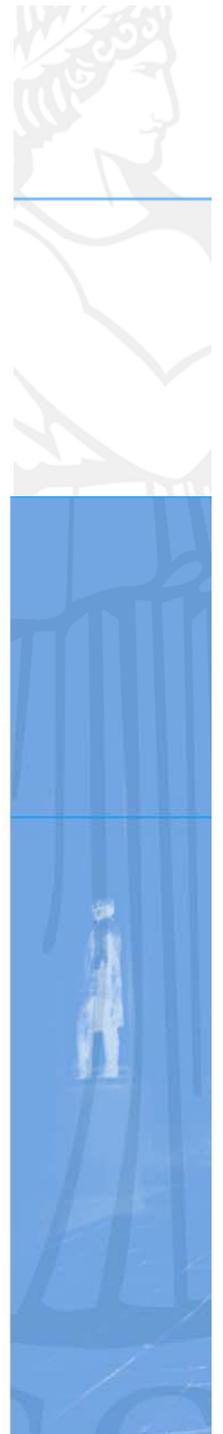




3. Maturing Years and New Challenges

Situation at ~30 years of age illustrated by the 1988 evaluation:

- Broader scientific spectrum (at the cost of nuclear physics)
- Roughly constant number of professors, several non-tenured assistant professors
- Roughly constant number of stipendiates (~15); more advanced ones than in early years; no 'national quota' any more

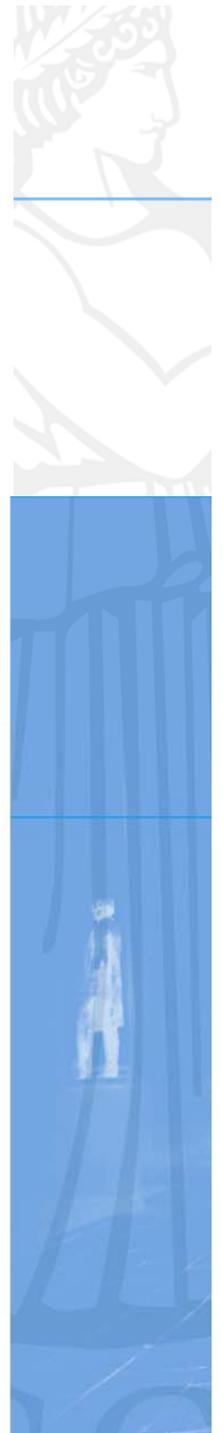




3. Maturing Years and New Challenges (2)

Challenges pointed out by the 1988 evaluation:

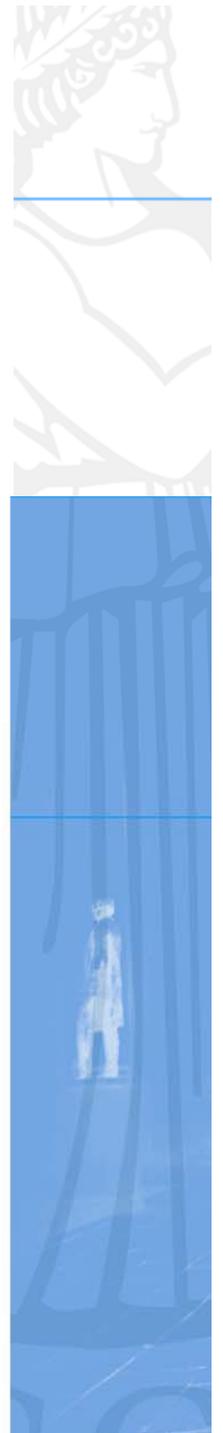
- Find its place in a new Nordic environment, where several university theory departments outsize NORDITA
- Face the competition from theory institutes elsewhere in the world (and young people's first choice was no longer NORDITA)
- Interaction with Nordic universities needed further strengthening
- Restore educational programme appropriately
- Various suggestions concerning governance, information, etc.





4. Nuclear theory departing from NORDITA

- The success of Nuclear Physics at NORDITA and the Niels Bohr Institute culminated with the award of the Nobel Prize to Aage Bohr and Ben Mottelson
- A number of unfortunate circumstances thereafter probably contributed to weakening the presence of nuclear theory at NORDITA
- Sufficient effort may not have been devoted to the renewal of the field, e.g. no replacement of Gerald E. Brown and James Hamilton
- It may have been a deliberate action by the governing board to reduce nuclear theory, considering its mission completed
- Nuclear theory is absent from the scientific programme of 'New Nordita' at Stockholm

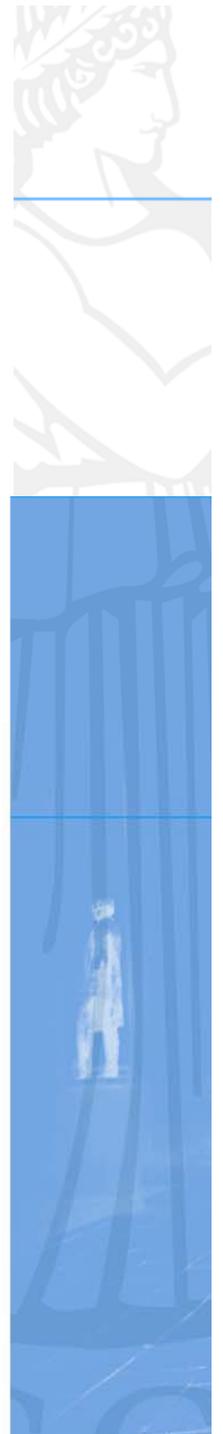




5. Other nuclear theory initiatives inspired by NORDITA

Towards a European institute (~1990)

- Internal challenges for nuclear physics inside NORDITA
- Increased political and economic pressure against Nordic scientific institutions
- Nordic vs European cooperation
- Attempt by Ben Mottelson and Aage Winther to establish a European Nuclear Theory Institute in Copenhagen
- Eventually, ECT* was created in Trento in 1993

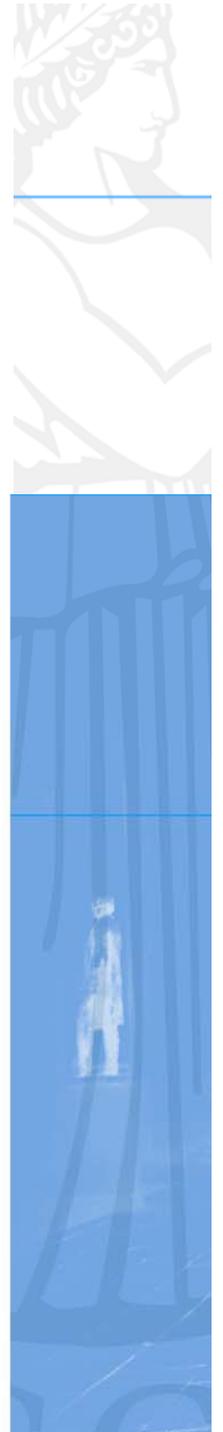


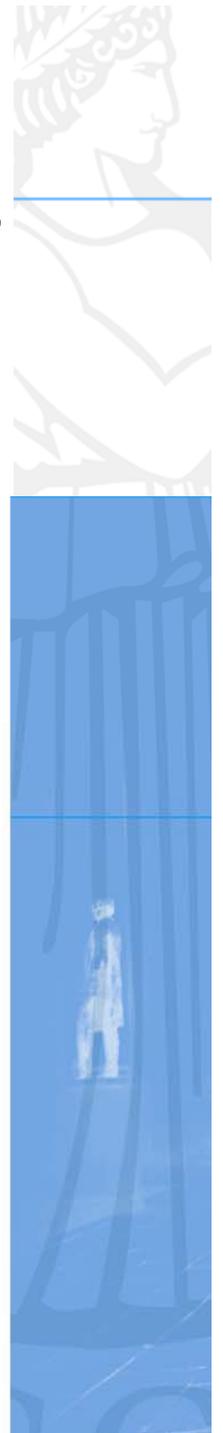


5. Other nuclear theory initiatives inspired by NORDITA (2)

Further initiatives:

- 'Northern European' initiative (RNBT) by Jan S. Vaagen and Russian and British colleagues
- Bergen-Oslo Nuclear Theory Team (BONTT) by Csernai & Vaagen (UiB) and Engeland & Osnes (UiO)





6. Is there a future for nuclear theory?

- Question the wisdom of defining/voting nuclear physics out of NORDITA, in view of the emerging fields of
 - heavy ion collisions
 - exotic nucleiand the associated experimental facilities at CERN
- MSU is creating a Theory Institute associated with their new radioactive beam facility FRIB
- In Europe we have ECT* and should make use of it;
however, Norway does not pay!
- Have to convince both our respective Physics Departments (and our Research Council) that Nuclear Theory has a future!



EPILOGUE

- 5 Remember therefore from whence thou art fallen, and repent, and do the first works; or else I will come unto thee quickly, and will *remove thy candlestick out of his place*, except thou repent.

Revelations 2;5

