

CURRICULUM VITAE

Name: Karl Nils Ingvar Otterlund

Nationality: Swedish

Born: 11 April 1935, Glimåkra, Sweden

Civil status: married with Lilian, 3 children: Anders (born 1963), Thomas (born 1994) and Gunilla (born 1970)

Affiliation: Division of Particle Physics, Department of Physics, University of Lund
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Degree: May 1969 Doctor of Philosophy (Fil.dr.) “Studies of High-Energy Nucleus-Nucleus Interactions”

Present Position: professor em, Lund University

Education: 1955 Studentexamen (higher school certificate)
1957 Officer in the Royal Swedish Navy reserve (top of the class at the Navy Cadet School)
1960 Fil kand exam (Bachelor of Science)
1962 Fil. mag. exam (Master of science)
1965 Fil. lic. exam
1969 PhD in Physics

Appointments: 1961-1969 Assistant, Lund Institute of Technology (LTH), Lund University (LU). The first employed assistant at LTH
1969 Appointed assistant professor (docent) in physics at Lund University
1969-1980 Assistant professor (docent) Lund University, research scientist
1980-1986 Associate professor (särskild forskare at the Swedish Natural Science Research Council (NFR))
1986-2000 Professor in physics, Lund University

Assignments: 1971-1973 *Chairman* of the Physical Society of the Lund University
1973-1977 *Secretary* of the Swedish Physical Society
1973-1977 *Secretary* of the Swedish National Committee of Physics of IUPAP
1973-1976 *Member* of the International Board of the Royal Swedish Academy of Science
1973-1976 *Member* of the Council of the European Physical Society (EPS), Geneva
1973-1976 *Member* of the EPS Committee for Conferences, Geneva
1975-1980 *Member* of the Section Board of the Faculty of Mathematics and Natural Sciences, Lund University
1983-1989 *Member* of the Programme Committee for Physics and Mathematics

(PuF) of the Swedish Natural Science Research Council (NFR)
1986-1989 **Vice Chairman** of the NFR Programme Committee of Physics and mathematics (PuF)
1986-1989 **Chairman** of the Swedish CERN Committee
1986 **Chairman** of the NFR group for evaluation of Swedish Condensed Matter Physics
1986-1989 **Swedish delegate** of the CERN Council
1986-1989 **Member** of the Swedish Natural Science Research Council
1990-1993 **Member** of the International Union of Pure and Applied Physics: Commission of Nuclear Physics (C12)
1993-1999 **Member** of the Faculty of Mathematics and Natural Sciences, Lund University
1993-1995 **Member** of the International Board of the Lund University (INTERPOL)
1992-1994 **Member** of the Executive Council of the Brookhaven National Laboratory (BNL) Relativistic Heavy Ion Collider (RHIC) experiment PHENIX
1992-1994 **Member** of the Executive Committee of the CERN Large Hadron collider (LHC) experiment ALICE (A Large Ion Collider Experiment)
1994-2002 **Deputy Chairperson** of the LHC ALICE Collaboration Board, CERN.
1994-2002 **Member** of the Management board of the ALICE experiment CERN
1995-1999 **Dean** of the Section Board of the Faculty of Mathematics and Natural Sciences, Lund University
1995 **Chairman** of the Swedish committee for promotion of scientists in nuclear and particle physics to become professors
1992-2000 **Head** of the division of Cosmic and Subatomic Physics, Lund University
2003 **Preses** of the Royal Physiographical Society, Lund

Undergraduate teaching: I have taught as university lecture at Lund Institute of Technology, LU, in about 2 years (during 1966 – 1971).

Graduate teaching: Under my supervision 14 graduate students have passed their PhD exams: Roland Resman (1971), Rune Kullberg (1975), Bo Jakobsson (1976), Kaj Söderström (1980), Sven Hertzman (1981), Evert Stenlund (1981), Anders Oskarsson (1983), Göran Claesson (1983), Ingemar Lund (1985), Stefan Persson (1989), Anders Ekelund (1992), Johan Idh (1993), Joakim Nystrand (1996) and Haiqiao Wang (1997). Also Tom Svensson (1999) and Karim El Chenawi (1999) have passed their PhD exam in my group.

Spokesperson of Experiments: Spokesperson of the CERN ISR experiment R415
Spokesperson of the CERN experiments EMU01 and EMU12
Spokesperson of the BNL (Brookhaven National Laboratory, USA) experiments E815 and E863

Organizer: **Chairman and organizer** of the Second International Conference on Nucleus-Nucleus Collisions, Visby, Sweden, 10 – 14 June 1985
Vice-chairman of the European Research Conference on Nuclear Astrophysics, Hersonissos, Crete, Greece, 29 – 3 June 1993
Chairman and organizer of the European Research Conference on Physics of High Energy Heavy-Ion Collisions, Vuosaari (Helsinki), Finland, 17 – 22 June 1994
Responsible and organizer of the following symposia arranged by the Royal Physiographical Society in Lund: “ De lärda sällskapen och framtiden” (2006), “Kunskapsleverans till näringslivet” (2009), “Forskningens etiska gränser” (2010) and “Forskningens styrning” (2011).

Award: In 1977 I was rewarded by the Royal Swedish Academy of Sciences for my work on reactions between particles with various properties and different masses (The Lindbom Price)

Honorary professor: 1995 Honorary professor at Central China Normal University, Wuhan, China

Publications: I have more than 250 publications in international refereed journals and more than 100 articles in conference proceedings.

Invited talks and seminars: Asilomar Pacific Grove (USA), Assuan (Egypt), HEPT Beijing (China), Bielefeld (Germany), Bergen (Norway), LBL Berkely (USA), Bombay (India), Cairo (Egypt), MIT Cambridge (USA), Campione d’Italia (Italy), Chandigarh (India), NBI Copenhagen (Denmark), Corfu (Greece), Delhi (India), East Lansing (USA), Erice Sicilly (Italy), GSI Darmstadt (Germany), Dubna (Russia), Geilo (Norway), CERN Geneva (Switzerland), Haifa (Israel), Il Ciocco (Italy), Jammu (India), Jaipur (India), Jerusalem (Israel), Kopervik (Norway), Kòsice (Slovakia), Kyoto (Japan), Marburg (Germany), Minnapolis (USA), Moscow (Russia), Munchen (Germany), Nordkirchen (Germany), Oslo (Norway), Ottawa (Canada), LPNHE Paris (France), Prague (Czech Republic), Santa Fee (USA), Seattle (USA), Spåtind (Norway), Stara Lesna (Czech Republic)), Strasbourg (France), Tashkent (Uzbekistan), ICTP Trieste (Italy), KEK Tuskuba (Japan), BNL Upton (USA), Vancouver (Canada), Warsaw (Poland), Washington (USA), Wuhan (China), Zakopane (Poland)

Research: Professor Ingvar Otterlund’s research covers heavy-ion physics at ultrarelativistic energies which is a field on the boundary between nuclear and particle physics. Before the availability of high energy heavy-ion accelerators, I studied nucleus-nucleus interactions induced by cosmic ray nuclei. In several publications very early results on pi-meson production and nuclear break up in high energy heavy-ion collisions were presented. Many of these results were later confirmed by experiments at the Lawrence Berkeley Laboratory (LBL) heavy ion accelerator the BEVALAC.
My PhD-thesis “Studies of High-Energy Nucleus-Nucleus Interactions” presented in 1969 is one of the first publications in high energy heavy-ion physics in the world. The thesis was translated into Russian when a heavy-ion accelerator in DUBNA outside Moscow, the

synchrotron, was operational for heavy ions shortly after my disputation. After my PhD I continued heavy-ion research at accelerators and built up a high-energy heavy-ion research group in Lund, Sweden. The operational start of the LBL (Berkeley) heavy-ion accelerator, the BEVALAC, increased the international activity in the field of relativistic heavy-ion physics. In early BEVALAC experiments we showed that the transverse communication during the reaction is of importance. A broad peak in the angular distribution of helium fragments was observed. The results were of importance for an animated discussion of shock-waves in nuclear matter (New Scientist 3 March 1977). Experiments were also performed at the DUBNA synchrotron.

When high energy protons became available at FERMILAB in 1972 I studied hadron-nucleus collisions. The most important results from these studies were the observations of the weak mass dependence of the pi-meson production (long formation time), the energy independent nuclear break up (limiting fragmentation) and the strong correlation between the multiplicities of recoiling protons and the amount of traversed nuclear matter (impact parameter selection). My extrapolations to high energy heavy-ion interactions were of importance in the planning of heavy-ion experiments at the CERN SPS.

I studied αp and $\alpha\alpha$ interactions at $\sqrt{s}=86$ GeV and $\sqrt{s}=125$ GeV respectively in collider mode at the CERN ISR starting 1980. From 1983 I was spokesperson of the ISR experiment R415. My most important results from this experiment were about p_t -distributions, pion multiplicities, proton distributions, stopping power and particle correlations. Rapidity density distributions of protons in $\alpha\alpha$ and dd interactions were studied using a method, suggested by me. The proton mass is assigned to all secondaries and spectra of negative particles is subtracted from those of positive. By this method it is possible to investigate the proton spectra in isoscalar beam interactions. I gave the review talk about results from light-ion interactions at CERN when the ISR was closed.

In the mid of 1980 nuclear and particle physicists had exhibited a common interest in exploring heavy-ion interactions at much higher energy in order to search for the formation of quark-gluon plasma i.e. heavy ions in the CERN SPS. I sent an application to the Swedish Natural Science Research Council (NFR) asking for Swedish contribution to the heavy ion injector. The application was approved. Due to this, Sweden was the first memberstate to contribute (5 MSEK) to the injector and this stimulated other states to follow Sweden and the heavy ion project at SPS was realized. One of my contributions to the SPS experiments was that I suggested to use the forward energy flow as a measure of the impact parameter in high-energy heavy ion interactions. I pushed very hard for this method (zero degree calorimeters) and it was adopted by most high energy heavy-ion experiments at the CERN SPS and the BNL AGS.

In 1985 we formed, by my initiative, an international collaboration named EMU01 to study heavy ion interactions at the CERN SPS. I was spokesperson for this collaboration. EMU01 collected data from the CERN SPS and the BNL AGS. We used beams of O, S, Ag and Pb. Rapidity density distributions of produced particles and distributions of recoiling proton were studied. We observed energy independence of produced particles in the projectile and target fragmentation regions, We used specially designed emulsion chambers exposed perpendicular to the beam for studies of particle fluctuations with very high precision..

I introduced the field of high energy heavy-ion physics to many research groups in CHINA and India. As an appreciation for this I became honorary professor at Central China Normal University, Wuhan in 1995.

At the CERN SPS we also participated in the heavy-ion experiments WA80, WA93 and WA98 where especially photon and pi-meson production were investigated.

I also participated in the BNL RHIC experiment PHENIX. The Lund-group was a member of this experiment from the beginning and I served on the Executive Council.

Also in the ALICE experiment at the CERN LHC (Large Hadron Collider) the Lund-group participated from the beginning. I was member of the Executive Committee and the Management Board of the ALICE experiment. I was deputy chairperson of the ALICE Collaboration Board during the years 1994 – 2002.