

Selected Publications - a Guide

Detector Development

Messung der Gasverstärkung in Methan bei niedrigen Drucken mit einem Transmissions-Proportional-Zählrohr für Spaltprodukte

H.J. Specht und P. Armbruster

Nukleonik 7 (1965) 8-14

Expanded part of the diploma thesis, starting a life-long dedication to detector development. Lowest pressure in wire counters ever (0.3 Torr)

Atomic Physics: Inner-Shell Ionization in Heavy Ion Collisions

Ionisation innerer Elektronenschalen bei fast-adiabatischen Stößen schwerer Ionen

H.J. Specht

Z. Phys. 185 (1965) 301-330

Expanded part of the PhD thesis, opening a whole field including the notion of correlation diagrams (first hints by P. Armbruster)

Impact-Parameter Dependence of Noncharacteristic Radiation Emitted in 35-Me Cl-Cl Collisions

I. Tserruya, H. Schmidt-Böcking, R. Schulé, K. Bethge, R. Schuch and

H.J. Specht

Phys. Rev. Lett. 36 (1976) 1451-1454

First of a series of papers by R. Schuch et al. on characteristic and non-characteristic X-ray emission in heavy ion collisions (up to 1984)

Nuclear Physics: Fission Isomers (the double-humped barrier)

A High Resolution Study of the ^{239}Pu (d,pf) Reaction
H.J. Specht, J.S. Fraser, J.C.D. Milton and W.G. Davies
Physics and Chemistry of Fission, IAEA, Vienna (1969) 363-373

Transmission-resonance spectroscopy (part of the Habilitation Thesis)

Identification of a Rotational Band in the ^{240}Pu Fission Isomer
H.J. Specht, J. Weber, E. Konecny and D. Heunemann
Phys. Lett. 41B (1972) 43-46

The pioneering paper with the experimental proof for nuclear shape isomerie with a 2:1 deformation (V. Strutinski, Generalized nuclear shell model)

The Quadrupole Moment of the 8 μs Fission Isomer in ^{239}Pu
D. Habs, V. Metag, H.J. Specht and G. Ulfert
Phys. Rev. Lett. 38 (1977) 387-389

First quadrupole measurement with the charge-plunger technique

Spectroscopic Properties of Fission Isomers
V. Metag, D. Habs and H.J. Specht
Physics Reports 65 (1980) 1-41

Final Review of the world-wide unique set of results on fission isomers by the Heidelberg group

Nuclear Physics: Fission Fragment Mass Distributions

Symmetric and Asymmetric Fission of Ac Isotopes near the Fission Threshold
E. Konecny, H.J. Specht and J. Weber
Phys. Lett. 45B (1973) 329-331

*First of a series of measuring triple-humped fragment mass distributions
and their relation to octupole deformations in the late fission process .*

Nuclear Fission
H.J. Specht
Rev. Mod. Phys. 46 (1974) 773-787

Final Review of all results on nuclear fission during the Munich time

Nuclear Physics: Heavy-Ion induced Fission and 'Break-up' processes

Direct Observation of Coulomb Fission of ^{238}U with ^{184}W Projectiles
H. Backe, F. Weik, P.A. Butler, V. Metag, J.B. Wilhelmy, D. Habs, G. Himmele and H.J. Specht
Phys. Rev. Lett. 43 (1979) 1077-1080

Experimental Features of Coulomb Fission
G. Himmele, H. Backe, P.A. Butler, D. Habs, V. Metag, J.B. Wilhelmy and H.J. Specht
Nucl. Phys. A391 (1982) 191-204

*Detection of Coulomb Fission, i.e. a process analogous to the wide-spread
field of Coulomb Excitation as a tool for nuclear structure studies, but with
enough transfer of energy to pass the fission barrier (about 6 MeV)*

A Square Meter Position Sensitive Parallel Plate Detector for Heavy Ions

D. v. Harrach and H.J. Specht

Nucl. Instr. Meth. 164 (1979) 477-490

An element of the special installation at the UNILAC at GSI Darmstadt, named 'Heidelberger Fass' in the local jargon. An evacuated container of several meter diameter and height houses freely movable large-area parallel-plate avalanche detectors and a large ionization chamber. The set-up allows kinematically complete (exclusive) measurements of 3 or 4 nuclei in the final state at a time, when small Si detectors were common

Angular Momentum Transfer in Deeply Inelastic Collisions from Exclusive Sequential-Fission Experiments

D. v.Harrach, P. Glässel, Y. Civelekoglu, R. Männer and H.J. Specht

Phys. Rev. Lett. 42 (1979) 1728-1732

Three-Particle Exclusive Measurements of the Reactions $^{238}\text{U}+^{238}\text{U}$ and $^{238}\text{U}+^{248}\text{Cm}$

P. Glässel, D. v.Harrach, Y. Civelekoglu, R. Männer, H.J. Specht, J.B. Wilhelmy, H. Freiesleben and K.D. Hildenbrand

Phys. Rev. Lett. 43 (1979) 1483-1486

Direct Observation of Proximity Effects in Ternary Heavy Ion Reactions

D.v.Harrach, P. Glässel, L. Grodzins, S.S. Kapoor and H.J. Specht

Phys. Rev. Lett. 48 (1982) 1093-1097

Direct Observation of Non-Equilibrium Effects in Sequential Fission

P. Glässel, D. v.Harrach, L. Grodzins and H.J. Specht

Phys. Rev. Lett. 48 (1982) 1089-1093

A great richness of scientific topics from well-defined exclusive final states...

Summary of the Symposium

H.J. Specht

Physics and Chemistry of Fission 1979, IAEA, Wien (1980) II, 459-476

A formal end to an era, having contributed to all (4) IAEA symposia since 1965. This was the last and concluding one.

At the dawn of high-energy heavy ions at CERN

Future Experiments (Summary Talk)

H.J. Specht

in Proc. Workshop on Future Relativistic Heavy Ion Experiments (Darmstadt 1980), GSI 81-6, Darmstadt (1981), 551-558

*The workshop at GSI which is unofficially named 'Quark Matter I'.
Public plea for using CERN accelerators for Quark Matter research
rather than to build a non-competitive machine at GSI*

Production of Prompt Positrons at low p_T in 63 GeV pp Collisions at the ISR

T. Akesson et al, The Axial Field Spectrometer (AFS) Collaboration (full author list see list of publications)
Phys. Lett. 152B (1985) 411-418

The Production of Prompt Positrons at Low Transverse Momentum increases with the Square of the Associated Charged Multiplicity

T. Akesson et al., The Axial Field Spectrometer Collaboration
Phys. Lett. B192 (1987) 463-470

The only hints for an excess of low-mass dileptons in high-energy pp so far

Soft Photon Production in 450 GeV/c p-Be Collisions

J. Antos, H. Beker, S. Brons, K. Bussmann, S. Dagan, A. Drees, C. Erd, M.J. Esten, C.W. Fabjan, P. Glässel, U. Görlach, V. Hedberg, D. Lissauer, M.A. Mazzoni, N.A. McCubbin, M. Neubert, P. Nevski, L. Olsen, A. Pfeiffer, A. Ray, J. Schukraft, D. Shapira, J. Soltani, H.J. Specht, I. Stumer, J. Thompson, R.J. Veenhof, W.J. Willis, C. Woody
Z. Phys. C59 (1993) 547-553

A mysterious photon source with $p_T < 20$ MeV, most recently also observed in the very forward region of jets (in DELPHI)

Low-Mass Lepton-Pair production in p-Be collisions at 450 GeV/c

T. Akesson et al., HELIOS Collaboration (full author list see list of Publications)
Z. Physik C 68 (1995) 47-64

Dielectrons and dimuons from the same experiment; in contrast to previous experiments, no evidence for 'anomalous' pair production at moderate-energy pp. Soon after also confirmed by CERES for pBe and pAu

PRE-ALICE Discussion

Experimental Aspects of Heavy Ion Physics at LHC Energies

H.J. Specht

Proc. ECFA Large Hadron Collider Workshop, Eds. G. Jarlskog and D. Rein,
CERN 90-10 (1990) Vol. II, 1236-1251

Convener of the experimental discussion on a future LHC heavy ion program at the Aachen Workshop, providing input to the foundation of ALICE 1 year later

Heavy Ion Results / NA34-2-HELIOS

Inclusive negative particle p_T spectra in p-nucleus and nucleus-nucleus collisions at 200 GeV/u

T. Akesson, HELIOS Collaboration
Z. Phys. C46 (1990) 361-367

Inclusive photon production in pA and AA collisions at 200 GeV/u

T. Akesson et al., HELIOS Collaboration
Z. Phys. C46 (1990) 369-375

Measurement of the Transverse Energy Flow in Nucleus-Nucleus Collisions at 200 GeV per Nucleon

T. Akesson et al., HELIOS Collaboration
Nucl. Phys. B353 (1991) 1-19

Systematics of particle production, useful to understand the basics

Heavy Ion Results / NA45-CERES / Electron Pairs

A Highly Efficient Low-Pressure UV-RICH Detector with Optical Avalanche Recording

A. Breskin, R. Chechik, Z. Fränkel, D. Sauvage, V. Steiner, I. Tserruya, G. Charpak, W. Dominik, J.P. Fabre, J. Gaudean, F. Sauli, M. Suzuki, P. Fischer, P. Glässel, H. Ries, A. Schön and H.J. Specht
Nucl. Instr. Meth. A273 (1988) 798-802

R&D: potentially interesting, but dead-ended due to practical limitations

In-Beam Experience from the CERES UV-Detectors: Prohibitive Spark Breakdown in Multi-Step Parallel-Plate Chambers as compared to Wire Chambers

R. Baur, A. Drees, P. Fischer, Z. Fränkel, P. Glässel, H. Klein, A. Pfeiffer, A. Schön, A. Shor, H.J. Specht, V. Steiner, I. Tserruya, Th. S. Ullrich

Nucl. Instr. Meth. A343 (1994) 231-240

R&D: Several-stage parallel-plate counters for single UV-photon detection are strictly ruled out in large systems, given realistic beam conditions

The CERES RICH Detector System

R. Baur, A. Breskin, R. Chechik, A. Drees, U. Faschingbauer, P. Fischer, Z. Fränkel, J. Gläss, P. Glässel, C.P. de los Heros, D. Irmscher, R. Männer, A. Pfeiffer, A. Schön, J. Schukraft, Ch. Schwick, A. Shor, H.J. Specht, V. Steiner S. Tapprogge, G. Tel-Zur, I. Tserruya, Th. Ullrich, J.P. Wurm

Nucl. Instr. Meth. A343 (1994) 87-98

Successful R&D: the CERES RICHes have reached the theoretical limits for the number of UV-photons/ring and the spatial resolution of the ring centers, determining the mass resolution of the whole spectrometer

Enhanced Production of Low-Mass Electron-Pairs in 200 GeV/u S-Au Collisions at the CERN Super Proton Synchrotron

G. Agakichiev, R. Baur, A. Breskin, R. Chechik, A. Drees, C. Jacob, U. Faschingbauer, P. Fischer, Z. Fränkel, Ch. Fuchs, E. Gatti, P. Glässel, Th. Günzel, C.P. de los Heros, F. Hess, D. Irmscher, B. Lenkeit, L.H. Olsen, Y. Panebrattsev, A. Pfeiffer, I. Ravinovich, P. Rehak, A. Schön, J. Schukraft, M. Sampietro, S. Shimansky, A. Shor, H.J. Specht, V. Steiner S. Tapprogge, G. Tel-Zur, I. Tserruya, Th. Ullrich, J.P. Wurm, V. Yurevich

Phys. Rev. Letters 75 (1995) 1272-1275

The first clear sign of new physics from dileptons: strong excess yield above the known meson decays, attributed to thermal radiation mediated by the ρ meson. Most cited data paper of the whole SPS ion program (>500). Original CERES set-up

e+e- pair production in Pb-Au collisions at 158 GeV per nucleon
G. Agakichiev et al., CERES Collaboration (for full author list see list of Publications)
Eur. Phys. J. C 43 (2005) 475-413

The final summary paper of all Pb-Au results obtained with the original CERES set-up: on mass spectra, pT spectra and multiplicity dependences. Better resolution than in S-Au, confirmation of the strong excess yield above the known sources, but mass shift and broadening of the ρ remained indistinguishable due to insufficient statistics. For the same reason, no insight into the dilepton mass region >1 GeV was possible.

Enhanced Production of Low-Mass Electron-Positron Pairs in 40 A GeV Pb-Au Collisions at the CERN SPS
D. Adamova et al., CERES Collaboration
Phys. Rev. Lett. 91 (2003) 042301/1-5, nucl-ex/0209024 (2003)

The only dilepton results in the lower energy region so far, close to the expected QCD phase transitions. CERES TPC set-up

CERN LHC General Interest

Study of potentially dangerous events during heavy-ion collisions at the LHC
J.P. Blaizot, J.Iliopoulos (Chair of ad-hoc Committee), J. Madson,
G.G.Ross, P. Sonderegger, H.J. Specht
Yellow Report CERN 2003-001

A review of dangerous objects such as negatively charged strangelets, gravitational black holes and magnetic monopoles. Conclusion: 'We find no basis for any conceivable threat'

Heavy ion results / NA60 / Muon Pairs

First Measurement of the ρ Spectral Function in High-Energy Nuclear Collisions

R. Arnaldi et al, NA60 Collaboration (full author list see list of Publications)

Phys. Rev. Letters 96 (2006) 16302

Evidence for Radial Flow of Thermal Dileptons in High-Energy Nuclear Collisions

R. Arnaldi et al., NA60 Collaboration,

Phys. Rev. Lett. 100 (2008) 022302

First Results on Angular Distributions of Thermal Dileptons in Nuclear Collisions

R. Arnaldi et al., NA60 Collaboration

Phys. Rev. Lett. 102 (2009) 222301

NA60 Results on Thermal Dimuons

R. Arnaldi et al., NA60 Collaboration

Eur. Phys. J. C 61 (2009) 711

Evidence for the Production of Thermal Muon Pairs with Masses above

1 GeV in 158A GeV Indium-Indium Collisions

R. Arnaldi et al., NA60 Collaboration

Eur. Phys. J. C 59 (2009) 607

Superior data quality of this set of data compared to all other experiments in this field: effective statistics higher by a factor of nearly 1000.

Main conclusions: (i) close to the QCD transition, the in-medium ρ spectral function broadens ('melts'), but shows no shift in mass; (ii) above masses of 1 GeV, i.e. in the region of flat spectral functions, both the slope $T > T_c$ of the dilepton invariant mass spectrum and the very low radial flow indicate the dominance of partonic emission sources in this region, a clear signal of deconfinement at SPS energies; (iii) zero polarization of the radiation,

consistent with a thermalized system

Thermal Dileptons from Hot and Dense Strongly Interacting Matter

Hans J. Specht, NA60 Collaboration

AIP Conf. Proceedings 1322 (2010) 1-10, nucl-ex 1011.0615 (2010)

A global summary of the central NA60 results on thermal dileptons, also emphasizing the model-independence of the temperature extracted from the high-mass part of the mass spectrum ('the only Lorentz-invariant thermometer of the field')

Hadron Structure / NA60

Study of the electromagnetic transition form-factors in $\eta \rightarrow \mu^+ \mu^- \gamma$ and $\omega \rightarrow \mu^+ \mu^- \pi^0$ decays with NA60

R. Arnaldi et al, NA60 Collaboration

Phys. Lett. B 677 (2009) 260

Confirmation of the long-standing strong violation of VMD in the region close to the kinematic cut-off of the ω Dalitz decay measured in the 80ties, with an improved statistics by a factor of 10. A follow-up NA60 paper using the p-A data has just confirmed (2016, see publ. list) the anomaly by another factor of 10. So far, no theoretical description is able to describe this.

Neuroscience

Morphology of Heschl's gyrus reflects enhanced activation in the auditory cortex of musicians
P. Schneider, M. Scherg, H.G. Dosch, H.J. Specht, A. Gutschalk, A. Rupp
Nature Neuroscience 5 (2002) 688-694

*Expanded part of PhD Thesis P.Schneider (Tutors G.Dosch and H.J.Specht).
Musical Aptitude ('Talent') visible in the size of the relevant gray matter
region in Heschl's gyrus*

Structural and functional asymmetry of lateral Heschl's gyrus reflects pitch
perception preference
P. Schneider, V. Sluming, N. Roberts, M.Scherg, R. Goebel, H.J. Specht,
H.G. Dosch, S. Bleek, C. Stippig & Andre Rupp
Nature Neuroscience 8 (2005) 1241-1247

*Left/right asymmetry of Heschl's gyrus correlated with capability to
recognize musical pitch vs. overtones*