

Emanuele Pace is full professor of "Nuclear and Subnuclear Physics" at the University of Rome "Tor Vergata" since 2002. He is teaching "Quantum Mechanics 2" and "Hadronic Physics" at the physics graduate course and "Theoretical Physics 1" at the undergraduate physics course.

1946 Born in Rome

1966-1970 Study in Physics at Universita' degli Studi di Roma "La Sapienza".

1970 Passed Doctoral exam Cum Laude. Specialization: Theoretical Physics.

1971 Fellowship at Centro Siciliano di Fisica Nucleare e Struttura della Materia and Assistant Professor at Universita' degli Studi di Catania, Theoretical Physics.

1972-73 Fellowship at Universita' degli Studi di Roma "La Sapienza".

1973-74 second lieutenant, Genio Aeronautico.

1974-81 research contract at Universita' degli Studi di Roma "La Sapienza", Department of Physics.

1981-88 researcher at Universita' degli Studi di Roma "La Sapienza", Department of Physics.

1988-2002 Associate Professor of "Neutron Physics" at Universita' degli Studi di Roma "Tor Vergata", Department of Physics.

2009-2012 President of "Consiglio di Corso di Studi in Fisica" at the Rome "Tor Vergata" University.

2012-2014 Coordinator of Corsi di Studi in Fisica at the Rome "Tor Vergata" University

2012-2014 Member of the national board for scientific habilitation of associate and full professors in Theoretical Physics of Fundamental Interactions.

Emanuele Pace was Local Scientific Coordinator of approved PRIN projects for years 1997, 1999, 2001, 2003 and did participate to an approved PRIN 2008 project (Local Scientific Coordinator Carlo Schaerf, Scientific Coordinator Franco Bradamante).

He first studied the ground state properties of three-nucleon systems, using an original basis of harmonic oscillator eigenfunctions in intrinsic coordinates, and the ^3H and ^3He electrodisintegration cross sections.

Then he studied the 'y-scaling' of inclusive quasielastic (qe) cross sections for electron scattering by nuclei with proper definitions of the scaling variable and the scaling function, in agreement with the relativistic kinematics, presently used by experimental groups. He performed the analysis of experimental cross sections to determine the nucleon momentum distributions in nuclei, from deuteron up to nuclear matter, stressing the relevance of the short-range correlations.

Since 1992 he studies the cross sections of polarized electron scattering by polarized ^3He and ^3H targets, in different energy and momentum transfer regimes, to gain information on the elastic form factors (ff) of neutron and on its deep inelastic structure functions (SF). Indeed, in asymmetry measurements in polarized electron scattering, polarized ^3He can play the role of an effective neutron target, as was shown in a theoretical cross section analysis and in a quantitative evaluation of the neutron and proton contributions to the asymmetry, performed with the best realistic two-nucleon and three-nucleon interactions.

The analysis of the ^3He q_e transverse asymmetry allowed a wide international collaboration to extract from the experimental asymmetry the neutron magnetic ff for Q^2 from $0.1 (\text{GeV}/c)^2$ up to $0.6 (\text{GeV}/c)^2$ and to study the Burkhardt-Cottingham and Gerasimov-Drell-Hearn sum rules.

He proposed procedures to extract the spin deep inelastic SF of the neutron from the ^3He spin SF, currently used by the experimental groups, and iterative procedures to determine the neutron deep inelastic SF, F_2 , up to $x < 0.85$, from a joint analysis of the experimental values of F_2 for deuteron, ^3He and ^3H .

A proposal, C12-10-103, to measure the F_2^n / F_2^p , d/u ratios and $A=3$ EMC effect in deep inelastic electron scattering off Tritium and Helium mirror nuclei, presented by the JLab MARATHON Collaboration has been approved by Jefferson Lab PAC37.

From 1994 he is developing a relativistic constituent quark model for hadrons, within the light-front relativistic Hamiltonian dynamics (LFHD), based on exact eigenstates of mass operators able to reproduce a wide part of hadron spectrum of mesons and baryons. Using a one-body electromagnetic current and phenomenological Dirac and Pauli ffs for the constituent quarks, the ffs of pseudoscalar mesons, of nucleons and of transitions to the main baryonic resonances can be described.

From 1997, again within the framework of LFHD, he studies the properties of an electroweak current operator, needed for a Poincare' covariant relativistic treatment of lepton scattering off systems of interacting particles. This current allows one to evaluate elastic and transition hadron form factors without ambiguities.

From 2002 within the framework of the light-front dynamics he studies the hadron electromagnetic ffs in the timelike and in the spacelike region, with an explicitly covariant formalism in a constituent quark model, using Mandelstam formula and Bethe-Salpeter amplitudes and stressing the role of Fock-space components beyond the valence component.

In 2008, within the light-front dynamics, he proposed an exact tridimensional projection of the 4-dimensional em current, which satisfies the Ward-Takahashi identity for a two-fermion system and acts on the valence component of the system states. A Poincare' covariant current which fulfills the Ward-Takahashi identity and includes one-body and two-body terms generated in a four-dimensional Yukawa model, projected on the three-dimensional valence component, has been applied to the calculation of the deuteron magnetic moment.

The pion generalized parton distributions were investigated in the spacelike region within various covariant and light-front models. The role of the one-gluon-exchange dominance at short distances for the large momentum transfer behaviour of the ff and for the end-point behaviour of the longitudinal parton distributions has been stressed. Both the no-helicity flip and the tensor generalized parton distribution have been evaluated.

Longitudinal and transverse quark momentum distributions for the pion, the neutral vector mesons and the nucleon have been calculated.

For the nucleon, phenomenological vertex functions were considered, obtained through the

investigation of the spacelike and timelike electromagnetic ff within a light-front framework.

A Poincare' covariant spectral function and a distorted spin-dependent spectral function of ^3He were studied to extract the quark transverse-momentum distributions in the neutron from SIDIS experiments on ^3He , taking into account both the Poincare' covariance and the final state interaction. Part of the work was exploited to prepare the experimental proposals a) E12-10-006 on “Target Single Spin Asymmetry in Semi-Inclusive Deep-Inelastic ($e, e' \pi^+$) Reaction on a Transversely Polarized ^3He Target at 8.8 and 11 GeV”, and b) E12-11-007 on “Asymmetries in Semi-Inclusive Deep-Inelastic Electro-Production of Charged Pion on a Longitudinally Polarized He-3 Target at 8.8 and 11 GeV”, recently approved at the Thomas Jefferson National Laboratory.

Emanuele Pace is author of more than 100 articles in international scientific journals with referees and 70 contributions in Conference Proceedings, has ~ 3100 citations, an Hirsh index equal to 32 on Google Scholar and acts as a referee for Eur. Phys. J. A, Nucl. Phys., Few-Body Systems, Phys. Rev. and Phys. Rev. Lett.