



Giuseppe Gorini is Full Professor of Experimental Physics at Milano-Bicocca University since 2017. After graduating cum laude in Physics at Pisa University and Scuola Normale Superiore in 1985, Giuseppe Gorini received a PhD cum Laude in Physics at Scuola Normale Superiore (Pisa) in 1991. In 1989/90 he was employed as a researcher at the Istituto di Fisica del Plasma of CNR in Milano. In the period 1990/2000 he was a researcher, first at the Physics Department of Milano University and, later, of Milano-Bicocca University. Since 2000 he was associate professor at the Physics Department of Milano-Bicocca University.

The scientific career of Giuseppe Gorini can be divided in the two periods before and after the birth of Milano-Bicocca University in 1998. In the period up to 1998 he carried out research in the field of controlled thermonuclear fusion in the EURATOM framework. In collaboration with the Istituto di Fisica del Plasma of CNR and European partners Giuseppe Gorini worked on i) nuclear measurement techniques and ii) energy transport in plasmas.

i) For the past 35 years Giuseppe Gorini has been engaged in the development of new experimental methods for neutron measurements and related diagnostic techniques. In collaboration with other research groups in Europe he performed some of the first time resolved neutron measurements on fusion plasmas using the set of neutron diagnostics available at JET. The experience gained at JET was later used to review the state of the art of fusion neutron measurements and propose new instruments optimized for the application. These have now been developed into working systems for fusion neutron spectroscopy. As a result of his activity the group in Milan has now a leading role in nuclear measurements in plasmas.

ii) Before 1989 energy confinement studies in fusion plasmas were based on power balance analysis in quasi steady-state conditions. Since 1989 Giuseppe Gorini has contributed to the development of new investigation methods based on the plasma dynamic response to thermal perturbations. In these experiments the plasma heating is perturbed and the ensuing modulation of the electron temperature analyzed to determine the heat transport coefficients and their relation with plasma parameters. The investigation has revealed an intriguing complexity of the plasma response. The plasma appears to be a complex and strongly inhomogeneous system, capable of a non-local response to external variations and where the energy flux is caused by a variety of thermodynamic forces.

Since 1998 Giuseppe Gorini has undertaken new projects in experimental physics. He took part in the organization of Milano-Bicocca University both with teaching innovation and as a Faculty delegate for student's international mobility. He also created a new research line combining research in neutron and high energy photon spectroscopy instrumentation for plasma and material science. The instrumentation is developed mainly for the benefit of the JET facility and of the ISIS spallation neutron source in UK. The main projects since 1998 are:

i) MPRu and TOFOR projects for neutron spectroscopy on JET. These projects were carried out with EURATOM financial support in collaboration with Uppsala University. The MPR (magnetic proton recoil) spectrometer, in use at JET since 1996 for deuterium-tritium fusion measurements, was modified to be compatible with deuterium-deuterium measurements. The second spectrometer is based on the Time of Flight technique and was installed in 2006. These systems have provided unique observations of fast ion dynamics in plasmas.

ii) Projects for epithermal neutron spectroscopy on ISIS. Giuseppe Gorini was scientific responsible for the TECHNI project at Milano-Bicocca University. Funded by the EU under the fifth framework programme, TECHNI was a large network aimed at the development of novel neutron instrumentation. The main achievement of the Milano-Bicocca unit was the successful development of the Resonant Detector (RD) for epithermal neutron spectroscopy. RD units are now in use on the VESUVIO neutron spectrometer at the ISIS spallation neutron source because of the broader kinematic range opened up by the use of RD. The RD found useful application also in e.VERDI, another EU-funded project where the INFN research units of Milano-Bicocca and Roma Tor Vergata designed and built VLAD, a very low angle detector array for small angle neutron scattering experiments. VLAD provided a unique opportunity for measurements in a kinematic range hitherto unexplored combining large energy transfers (> 1 eV) and low momentum transfers.

iii) ANCIENT CHARM project (2006-2009). It was financially supported by the New and Emerging Science and Technology programme of EU FP6. ANCIENT CHARM involved 10 partners and was coordinated by Giuseppe Gorini. A nearly 2MEuro budget was invested towards the development of new neutron imaging techniques for Cultural Heritage objects.

iv) Gamma Ray Spectroscopy (GRS) on JET and ITER. Aim of the GRS project was the design, construction and exploitation of a new system for gamma ray spectroscopy in JET where the gamma rays come from nuclear reactions involving MeV ions. The project was funded by FP7, included four groups in Europe and was led by Giuseppe Gorini. The spectrometers are still in use as part of the JET diagnostic system. More recently Gorini's team was involved in the design of additional spectrometers on JET and the so called Gamma Camera for spatially resolved measurements on ITER. The latter project was financially supported by Fusion for Energy (F4E).

v) PANAREA project. It is financially supported by CNR and implements the CNR-STFC agreement for the use of ISIS by the Italian community. Since 2007 Giuseppe Gorini leads a nationwide team developing new instrumentation for the ISIS spallation source. Main outcomes are two experimental stations at ISIS for imaging and for irradiation of electronics components.

vi) In-kind contributions to ESS. Since 2011 Giuseppe Gorini's team in Milano-Bicocca takes part in the Italian in-kind contribution to the construction of the European Spallation Source in Lund, Sweden. The main contribution is the development of high rate detectors based on the Gas Electron Multiplier (GEM) technique and equipped with a high efficiency neutron converter. Another contribution concerns the application of ESS for fast neutron irradiation. Since 2017 Giuseppe Gorini is the sponsor of the VESPA project, a collaboration between CNR and STFC (UK) for the construction of a Vibrational Spectroscopy Beamline at ESS.

vii) PRIMA project. Since 2011 Giuseppe Gorini's team takes part in the construction of the ITER neutral beam heating prototypes SPIDER and MITICA at the Consorzio RFX in Padua. The project is financially supported by Fusion for Energy (F4E). Gorini's team is in charge of the neutron measurements including a GEM-based diagnostics (CNESM, Close-contact Neutron Emission Surface Mapping) for imaging of the deuteron beam.

viii) Eurofusion project. Eurofusion is a large Horizon 2020 project for the development of controlled thermonuclear fusion. Giuseppe Gorini leads the Eurofusion activities at UniMiB.

Giuseppe Gorini's citation report (WoS 26/03/2018): Journal papers=286, H=30, Sum of Times Cited= 3675, Average citations per year= 136.