

G. Turchetti CV

Graduated in Bologna in 1965, lecturer at Università Politecnica of Ancona in 1971, associate professor of Mathematical Physics since 1978, full professor since 1987 at the Physics Department of the University of Bologna.

G. T. spent various periods abroad including CPT in Saclay (FR), CERN in Geneva (CH), Atlanta University (USA), London University (Canada), PUC Rio de Janeiro (Brazil), CPT Marseille (FR), Brown University at Providence (USA).

In addition to teaching, G. T. carried out training and research activities as a supervisor for 22 doctoral theses and many degree theses. Of his students 8 are university professors and 8 researchers in particle accelerator laboratories. The research activity concerned non-linear physical systems. Starting from the perturbative development of effective renormalizable Lagrangians, G. T. showed that unitary approximations to the scattering amplitudes correctly describe medium-range interactions between two nucleons. G. T. proved that the Birkhoff normal forms for polynomial symplectic maps like the Hénon map are asymptotic because the Fourier components have singularities in correspondence with the resonances, which accumulate in the origin. Padé and Borel-Padé summation methods were proposed.

The most significant and internationally recognized contribution has been the non-linear theory for betatronic motion based on Birkhoff normal forms. This natural extension of the Courant and Sneider linear theory of betatronic motion has been applied to the stability analysis of the LHC beam in the presence of nonlinearities due to the multipolar errors in superconducting dipoles. The most recent activity concerned collective phenomena in beam dynamics and complex systems modelling addressed to the immune system and urban mobility

G. T. has organized 5 international conferences on non-linear dynamics of particle accelerators, workshops and round tables on laser acceleration, energy and complex systems.

G. T. has coordinated the first European network on non-linear dynamics in accelerators, has been coordinator of the Theoretical Physics section, of graduate studies in Physics and director of the Galvani Centre for Biocomplexity and obtained research grants from INFN, MIUR, EU.

After retirement on 1 November 2012 G. T. continued to teach a module of the Models and Numerical Methods in Physics course for the Master's Degree in Physics in Bologna and a similar course for the Doctorate in Science and Management of Climate Change of the Cà Foscari University of Venice.

G. T. research activity in this last period has concerned the laser plasma interaction and the related electron and proton acceleration techniques, the formulation of Lyapunov and reversibility fast invariant indicators and the formulation of models for complex.

Publications

The research activity is documented by 280 publications: 200 in peer reviewed international journals, 80 on proceedings of international conferences. Author of the book *Classical dynamics of physical systems*, and a monograph published by CERN (Yellow Report) edited several books. For the most recent publications and the complete list, see google scholar

Web site <http://www.physycom.unibo.it/>

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