

## **The High Energy and Particle Physics Prize 2011**

**Sheldon Lee Glashow (Boston University, USA)**

**John Iliopoulos (Ecole Normale Supérieure, Paris, France)**

**Luciano Maiani (University of Rome "La Sapienza", Italy)**

*For their crucial contribution to the theory of flavour, presently embedded in the Standard Theory of strong and electroweak interactions.*

The result, commonly referred to as "the GIM mechanism", is contained in the paper by S.L.Glashow, J.Iliopoulos and L.Maiani, "Weak Interactions with Lepton-Hadron Symmetry", Phys. Rev. D2 (1970) 1285. The paper showed that the introduction of the then undiscovered charm quark: i) would preserve and generalize Cabibbo universality of the weak interactions, guaranteeing, at the classical level, the absence of flavour-changing neutral currents and of transitions in which strangeness changes by two units; ii) would account for the observed suppression of the above processes if the charm quark mass is at the GeV scale, since these processes are generated at the quantum level, with effects controlled by the mass differences of quarks with the same electric charge. The GIM mechanism is a cornerstone of the Standard Theory of Strong and Electroweak Interactions and is at work also in its present version with three fermion families, whose flavour structure in the quark sector has been tested to an extraordinary and still increasing precision. The presence or the absence of a built-in GIM mechanism has been one of the most severe censors of possible new physics at and above the TeV scale (technicolor, supersymmetry, extra dimensions).

For further reading:

[http://www.scholarpedia.org/article/Glashow-Iliopoulos-Maiani\\_mechanism](http://www.scholarpedia.org/article/Glashow-Iliopoulos-Maiani_mechanism)