

## Report from the Jury of the Hanneke Janssen Memorial Prize 2024

The Jury has received 10 nominations for this year: from the USA, Italy, and the UK, including an unprecedented 7 nominations from the Netherlands.

After a first round we selected a shortlist of 3 top contenders for the Prize, consisting of Theses by Silvester Borsboom (nominated by Sebastian de Haro, UVA), Thomas Vissers (nominated by Klaas Landsman, RU) and Alex Fleuren, nominated by Niels Martens, UU).

Our unanimous decision is that the 2024 HJMP should be rewarded to Silvester Borsboom for his Thesis "*Spontaneous Breaking of Global Gauge Symmetries in the Higgs mechanism*". While all three finalists combined competence in modern physics with either a philosophical or historical component and a clear presentation, the Thesis by Borsboom stands out in terms of ambition, novelty, scope and philosophical significance.

The topic of this Thesis is the so-called "Higgs mechanism", i.e. the argument that a certain kind of massless elementary particles (bosons) can become massive by spontaneous breaking of a gauge symmetry. This argument led to the experimental search for such particles (known as Higgs bosons) and their discovery by CERN was considered a keystone to the completion of the so-called Standard Model of elementary particles. Even so, the Higgs mechanism has been subjected to severe criticism by philosophers, since gauge symmetries are usually regarded as symmetries in our description of physical systems, without empirical significance. The Thesis by Borsboom examines various open problems in this long-standing dispute with admirable care and presents significant novel contributions to their solution.

The Thesis by Vissers, "*The path to and from functional integration over Fermionic Fields*", was valued by the Jury because of its novelty in exploring several (mostly forgotten) historical actors in the development of the path integral theory for Fermions.

The Thesis by Fleuren, "*Another critical look at inflationary cosmology*", was valued for its lucid presentation and the wide scope of its analysis of the explanatory role of cosmic inflation in modern cosmology.

The Jury:

Jos Uffink (chair)

Guido Bacciagaluppi

Klaas Landsman\*

Christoph Lehner

Francesca Vidotto

\*Prof. Landsman recused himself from the Jury deliberations on the nominations he had been involved with.

