

## **HECA Seminar**

(High Energy, Cosmology and Astro-particle physics)

[HECA web-page](#)

Tuesday 05.11.2019, h 12:00

Pasteura 5, room B2.38 (Faculty of Physics)

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# **Dark Matter Sommerfeld-enhanced annihilation and Bound-state decay at finite temperature**

## Abstract

Astrophysical and cosmological observations from galactic to cosmological scales indicate the existence of dark matter. Nevertheless, most of its property still remain to be unknown and hence candidates range from  $10^{-31}$  to  $10^{50}$  GeV in its mass scale. Among them, the traditional dark matter candidate, so called WIMP (weakly interacting massive particle) is still attractive because its production mechanism, i.e., thermal freeze-out, naturally explains its abundance and pins down its mass scale to be  $1 \sim 10^5$  GeV. Moreover, the same interaction required for the thermal freeze-out allows us to detect them directly/indirectly. The key observable for this program is the abundance of dark matter, which is one exceptional parameter we measured very precisely, i.e., within 1% accuracy. Hence, it is desirable to give theoretical prediction of WIMP abundance for a given model within this accuracy. Based on these, I will talk about my recent attempts to refine the calculation of WIMP abundance regarding the Sommerfeld enhancement and bound state formation.

Best regards,

Andrzej Hryczuk  
Kamila Kowalska  
Kazuki Sakurai  
Enrico Maria Sessolo  
Krzysztof Turzyński