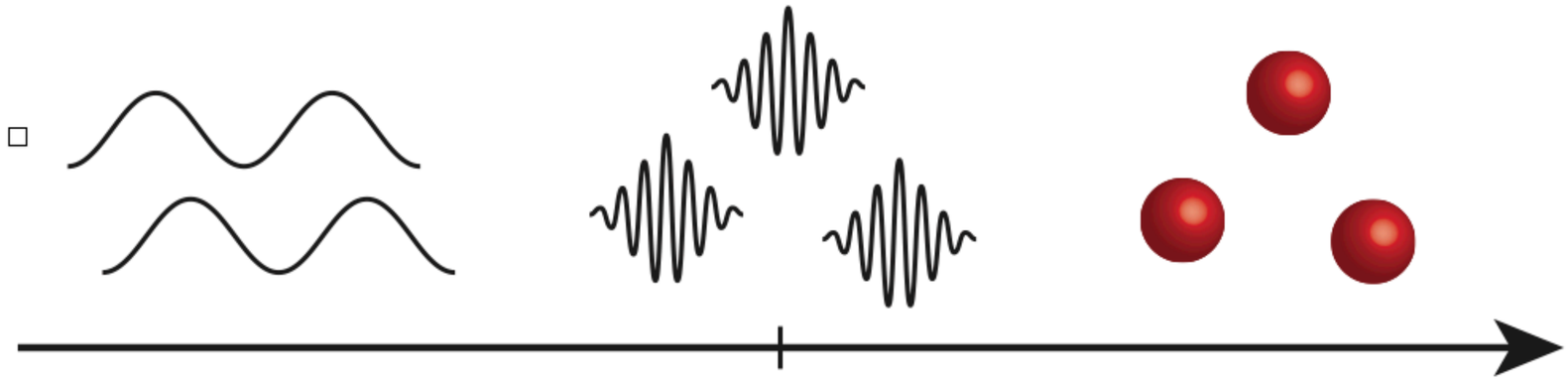
TOHOKU
UNIVERSITY

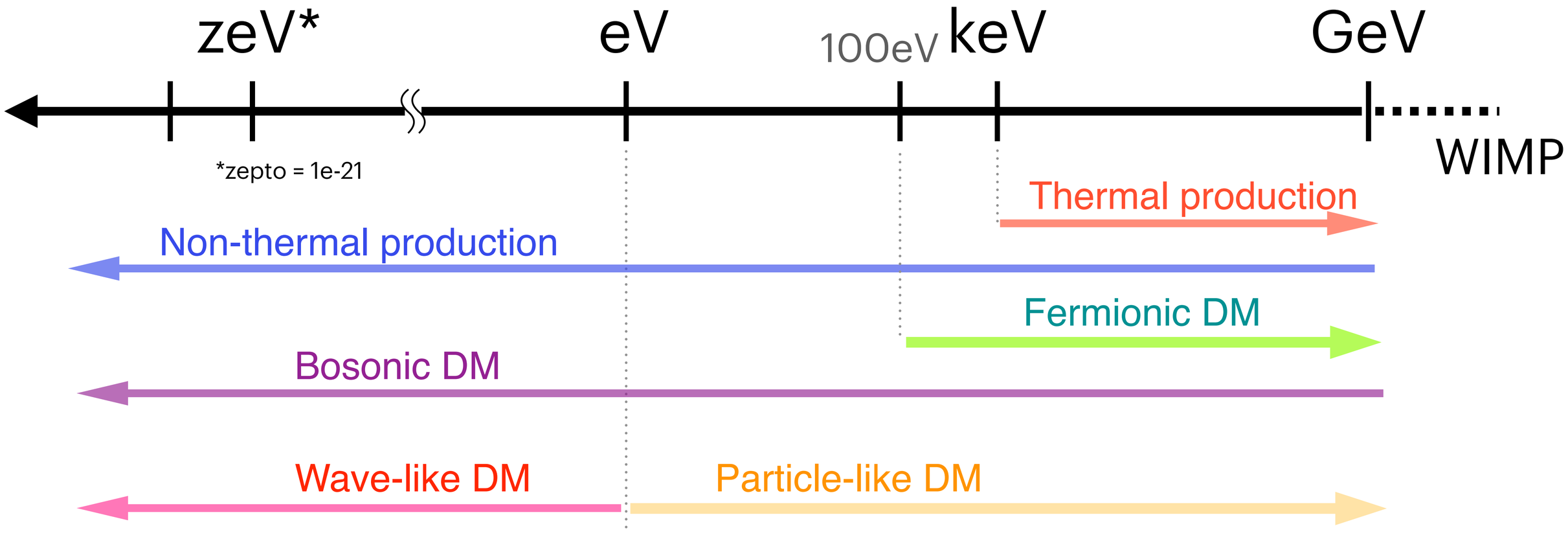
A01 : Light dark matter



Mar. 7. 2023 @
"What is dark matter? - Comprehensive study
of the huge discovery space in dark matter"

Fumi Takahashi (Tohoku)

Mass scale of light dark matter



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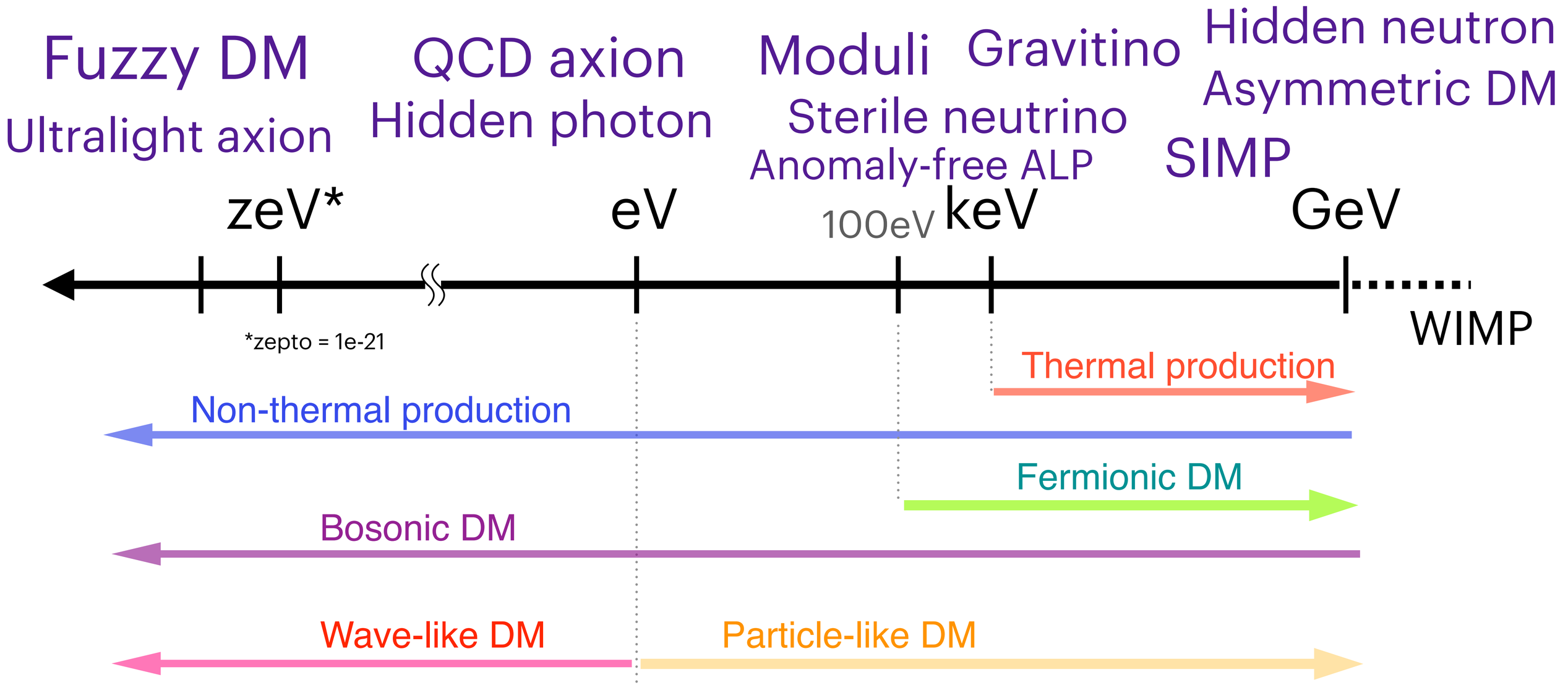


Members

Masahiro Kawasaki

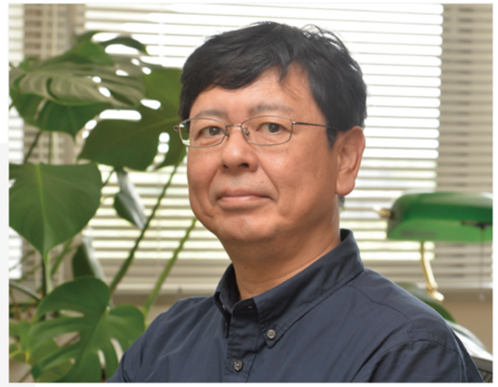
Naoya Kitajima

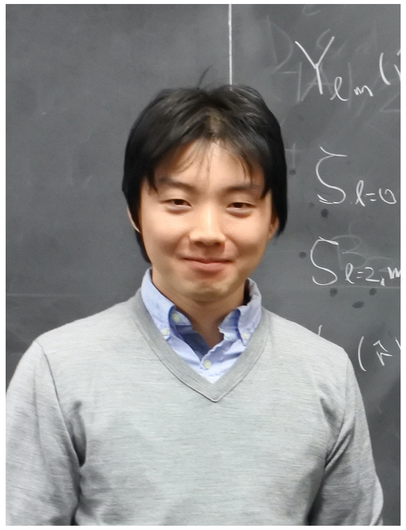
Fuminobu Takahashi

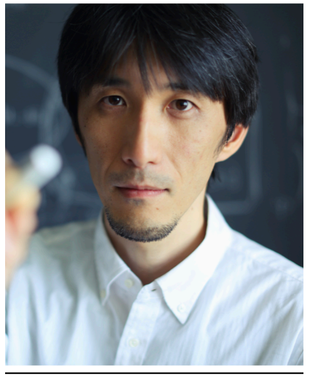
Masaki Yamada

Wen Yin

(Shota Nakagawa)



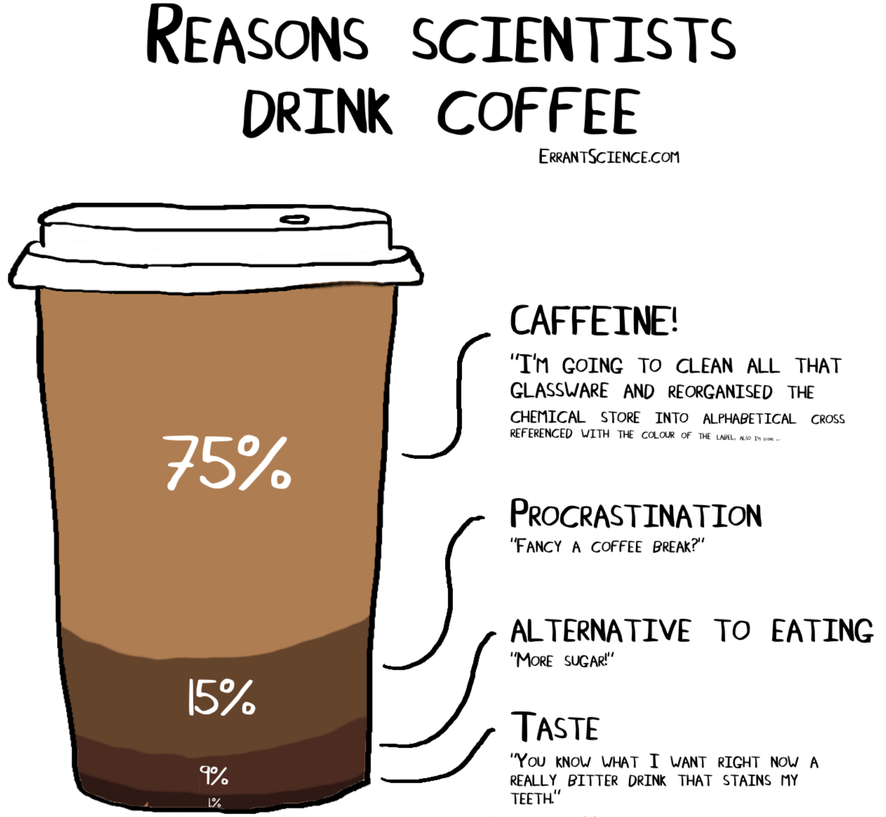




Papers

30 papers from A01 group since Apr. 2022.

(70 papers since Oct. 2020)



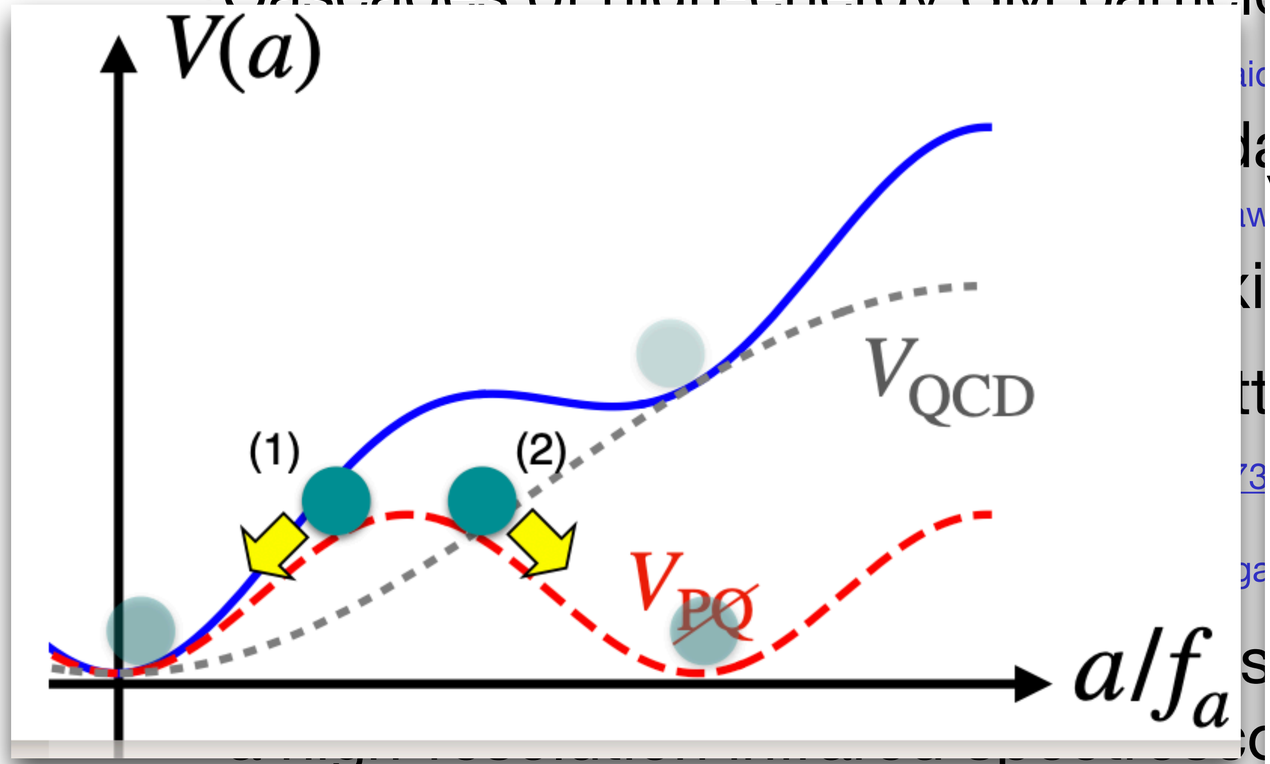
https://errantscience.com/

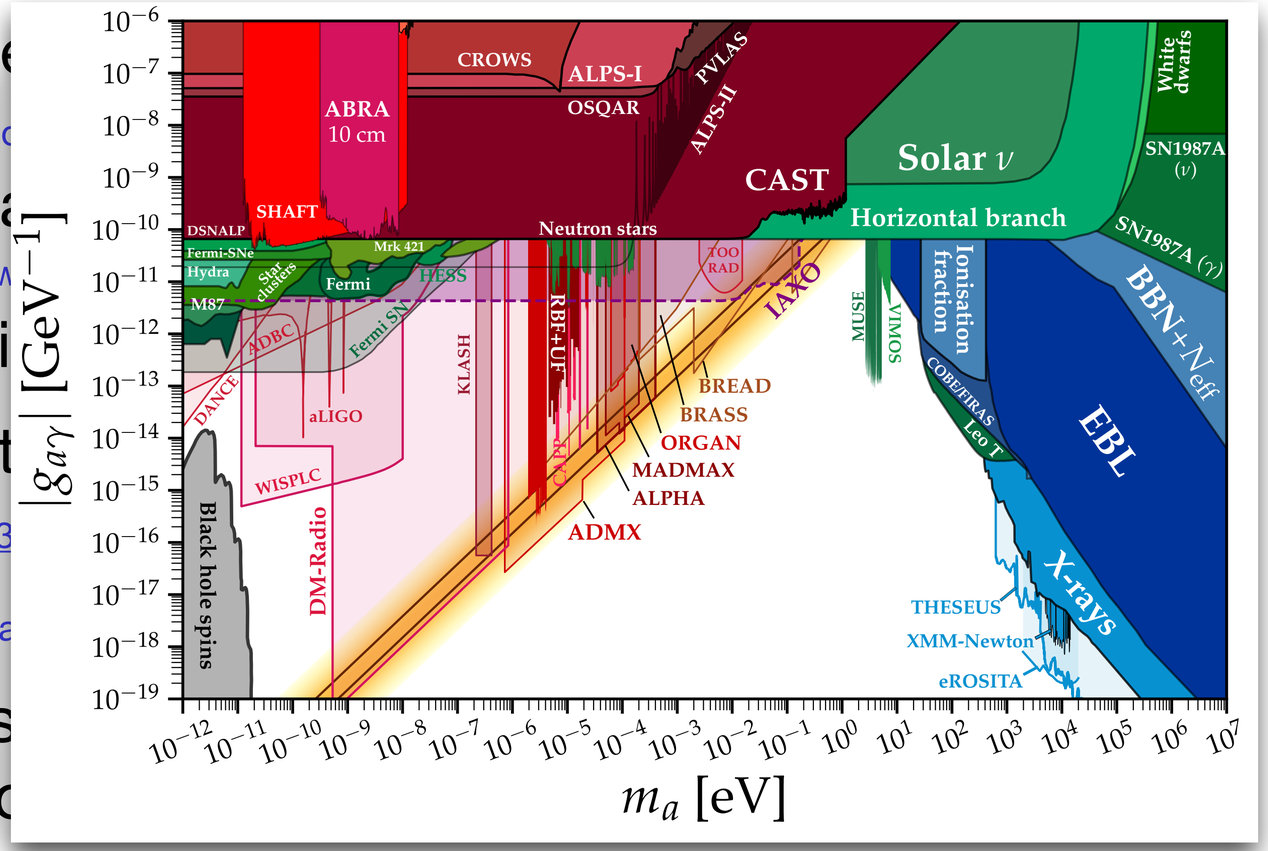
Highlights

- Cascades of high-energy SM particles in the primordial thermal plasma
  K. Mukaida and M. Yamada, 2208.11708
  See talk by Yamada
- Production of dark photon dark matter
  N. Kitajima and K. Nakayama, 2212.13573 N. Kitajima and FT, to appear
  See talk by Kitajima
- Dark Higgs early dark energy S. Nakagawa, FT, W. Yin, 2209.01107
  See talk by Nakagawa (also Murai-san's talk)
- Precise calculation of the effect of dark matter annihilation on CMB
  M. Kawasaki et al, 2105.08334, M. Kawasaki, H. Nakatsuka, and K. Nakayama 2110.12620
- Primordial black holes from QCD axion bubbles N. Kitajima and FT, *JCAP* 11 (2020) 060
- Indirect detection technique for eV-scale dark matter near with a high-resolution infrared spectroscopy T. Bessho, Y. Ikeda, W. Yin 2208.05975
- Axion dark matter from the trapped misalignment mechanism
  K.S. Jeong, K. Matsukawa, S. Nakagawa, FT, 2201.00681
- Isotropic and anisotropic cosmic birefringence from axion domain walls
  FT and W. Yin, 2012.11576, S. Nakagawa, FT, and M. Yamada, 2103.08153, N. Kitajima et al, 2205.05083, D. Gonzalez et al, 2211.06849

Highlights

•Cascades of high-energy SM particle





•Axion dark matter from the trapped misalignment mechanism

K.S. Jeong, K. Matsukawa, S. Nakagawa, FT, 2201.00681

•Isotropic and anisotropic cosmic birefringence from axion domain walls

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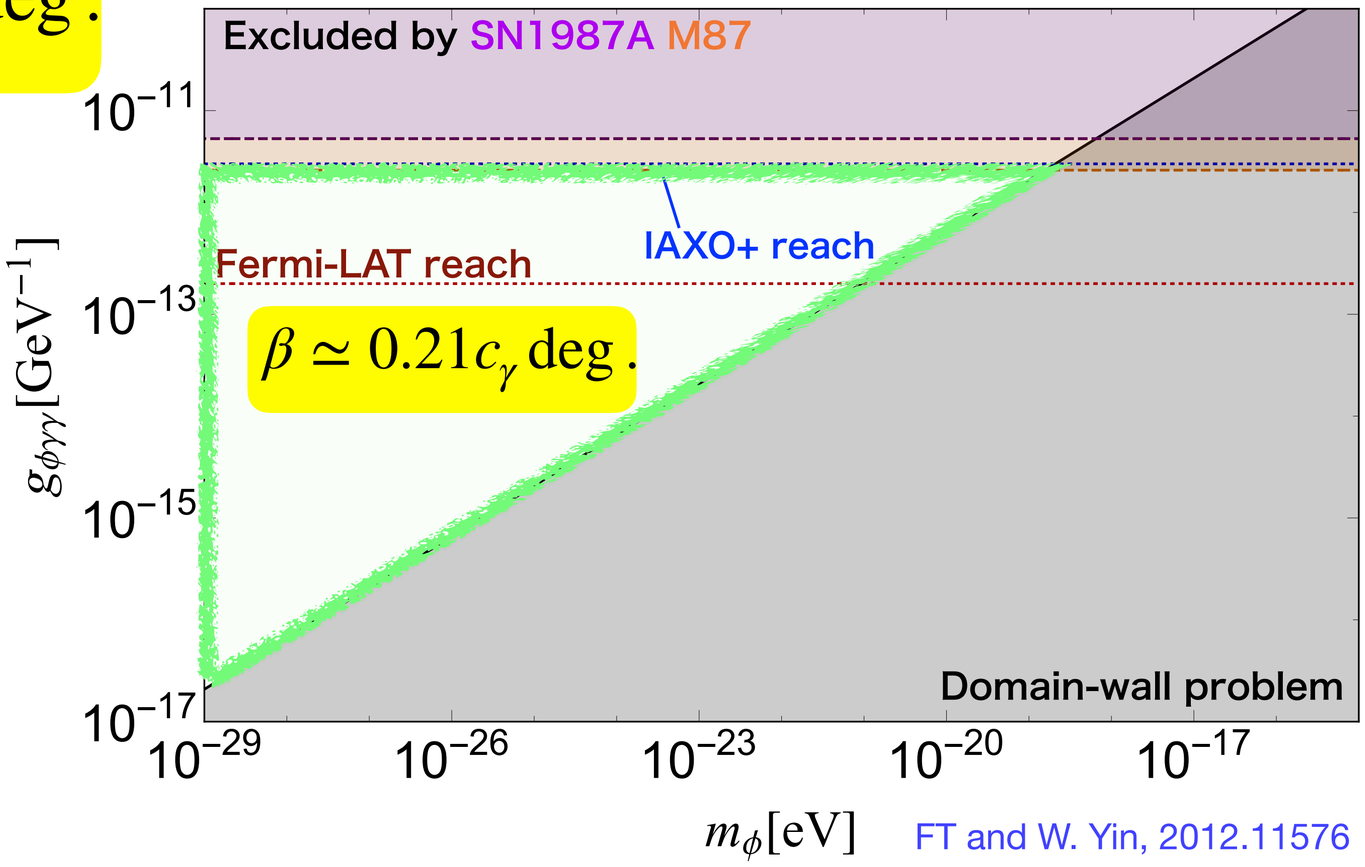
Isotropic CB from axion domain walls

$$\beta = \frac{1}{4\pi}\int d\Omega\, \Phi(\Omega) = \frac{1}{2} c_\gamma \alpha \simeq 0.21 c_\gamma \,\mathrm{deg}\,.$$

independent of m_ϕ and f_ϕ .

$\alpha = 1/137\,[\mathrm{rad}] \simeq 0.42\,[\mathrm{deg}]$

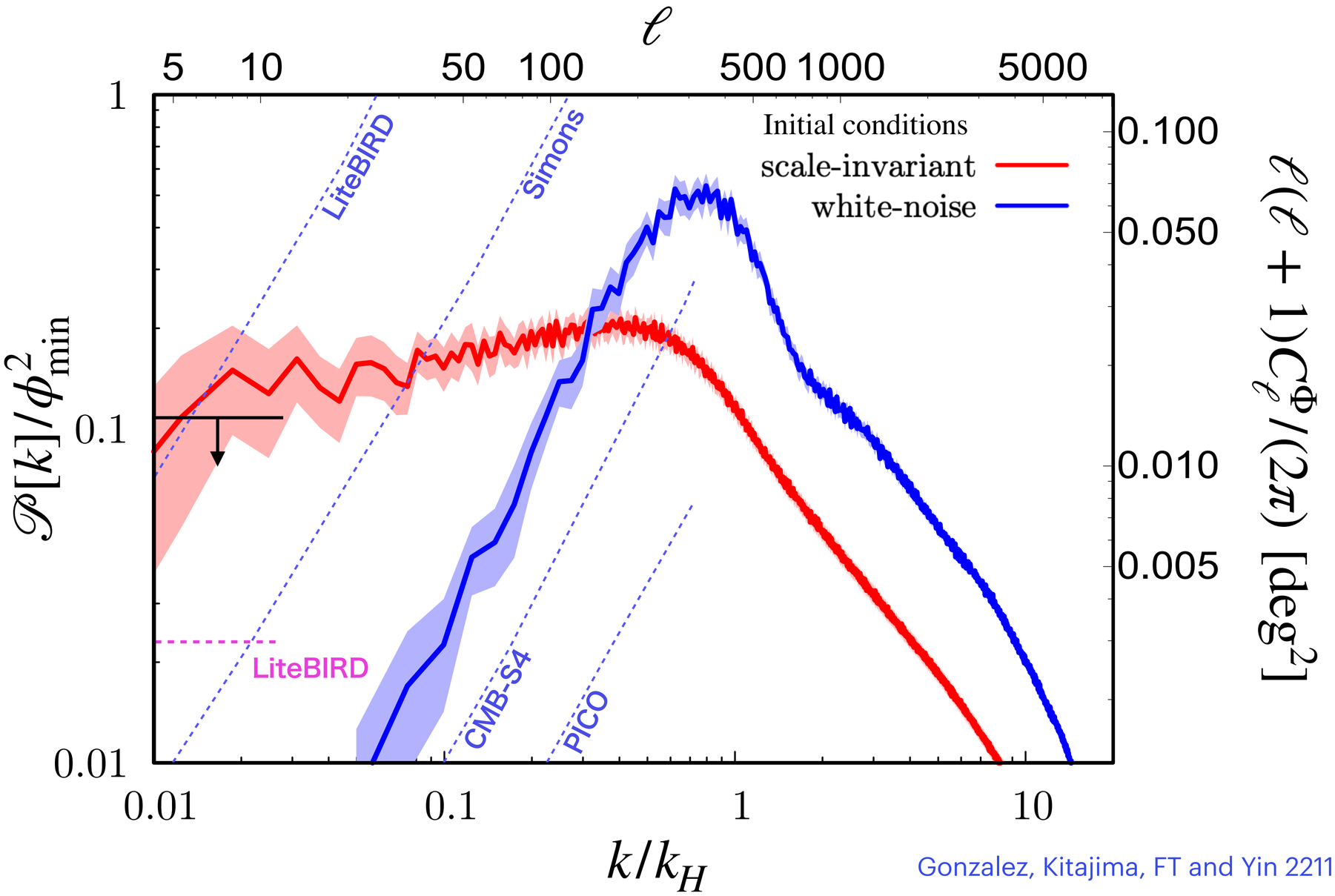
Naturally explains the recent hint for isotropic CB; $\beta = 0.36^\circ \pm 0.11^\circ$



Minami, Komatsu, Phys. Rev. Lett. **125**, 221301 (2020)
P. Diego-Palazuelos et al, Phys. Rev. Lett. **128**, 091302 (2022)

FT and W. Yin, 2012.11576

Anisotropic CB from axion domain walls



Gonzalez, Kitajima, FT and Yin 2211.06849

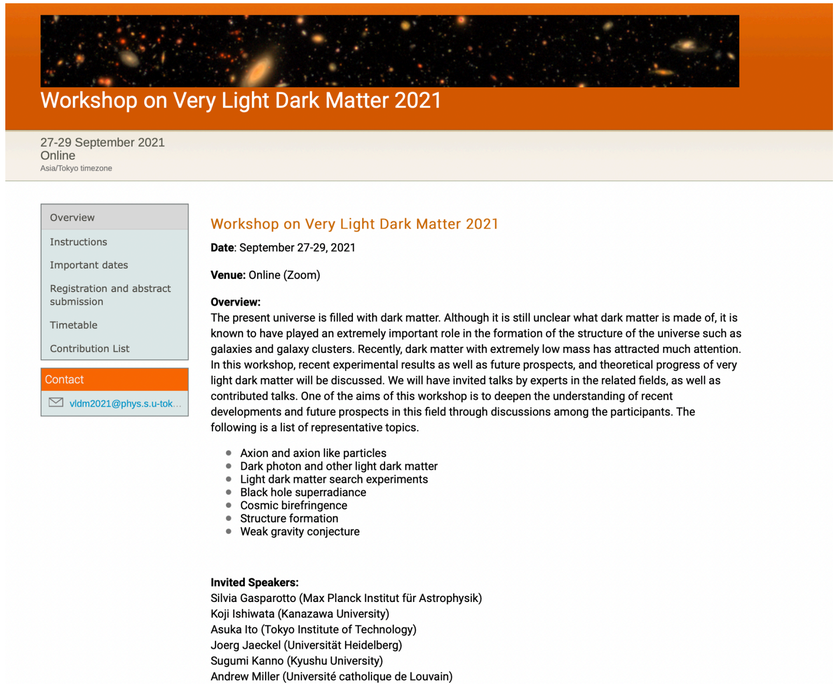
Workshops

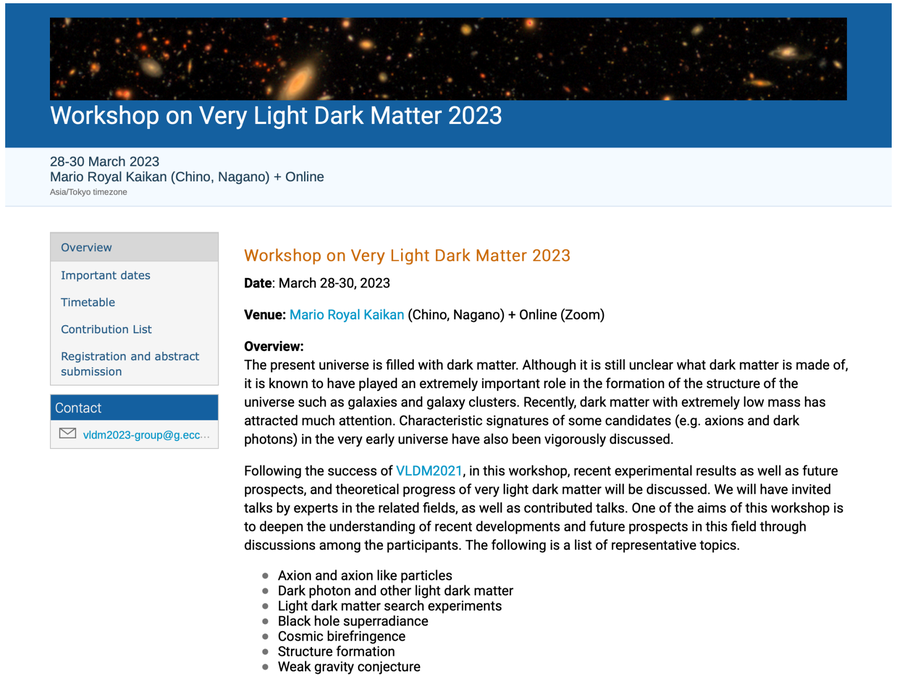
- Workshop on Very Light Dark Matter 2021 27-29 Sep. 2021

A01+B01

- Workshop on Very Light Dark Matter 2023 28-30 Mar. 2023

https://indico.ipmu.jp/event/416/ A01+A02+B01+B06





Organizers:

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Masaki Yamada (Tohoku)
Wen Yin (Tohoku)