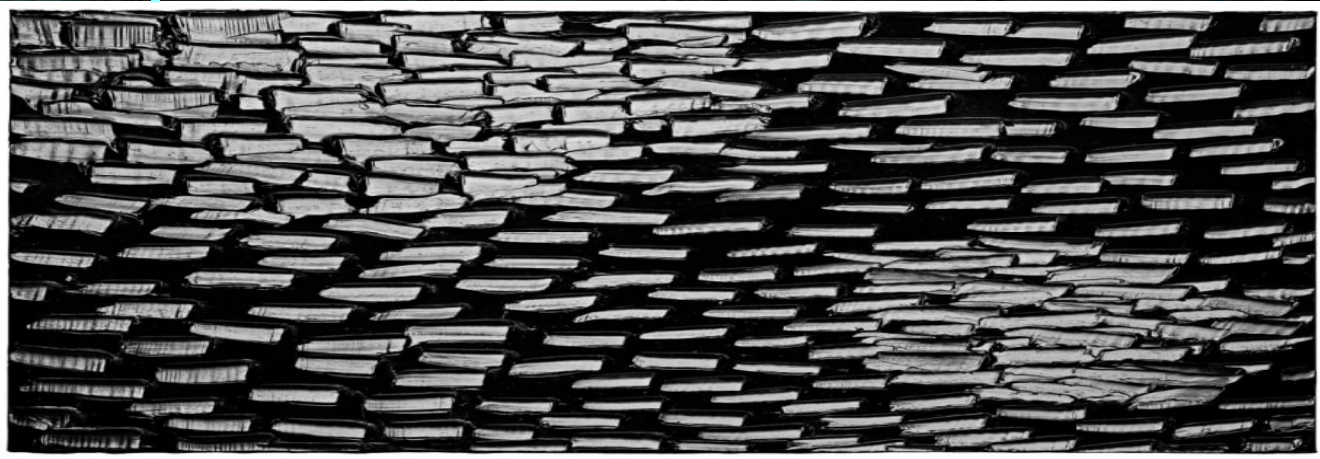


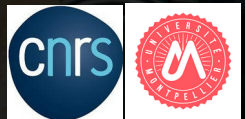
News from the dark

Episode 7: On Dark Matter Subhalos



Montpellier – *Historical building of the Faculty of Medicine*

June 15-17 2022



GaDaMa

GREATDIGINTHESKY



Welcome !

News from the Dark:

- A series of mini-workshops bringing together people working on DM from different perspectives (th/ph/mdl oriented).
- Limited size (~30 participants), on invitation, including young researchers.
- ~10 regular participants (tell the organizers if you want to come next time).
- No fees, participation support when possible.
- Spirit: share state-of-the art devs, unveil the dust under carpets(s), identify ways to improve.
- Room for (friendly) discussion (in principle).

Funding:

- ANR project GaDaMa, ERC project GREATDIGINTHESKY, CNRS-INSU national program PNHE, LUPM.

Next edition?

- Feel free to volunteer ;)
 - Feel free to propose topics.
- SOC: Local organizers + Benoit Famaey and myself.

Practical

WIFI:

- Eduroam active.
- Individual connection available (check in your badges)

Coffee breaks:

- In the courtyard.

Lunches:

- In the courtyard, individual lunchboxes.

Dinner on Thursday evening (take notes!):

- Restaurant “le Bastidon” outside from Montpellier, in Carnon, near the beach.
- Count ~1h15 door to door by tram (incl. 20 min walk) – check **instructions on the indico website**.
- Dinner at 20:00 => leave around 18:30

Questions?

- Ask Amel, Benoit, or myself.

Episode 7: Dark matter subhalos

DM subhalos: connecting fundamental unknowns

Origin of cosmological perturbations

→ Primordial power spectrum (PS)

(on scales much lower than CMB can touch)

Nature and origin of dark matter

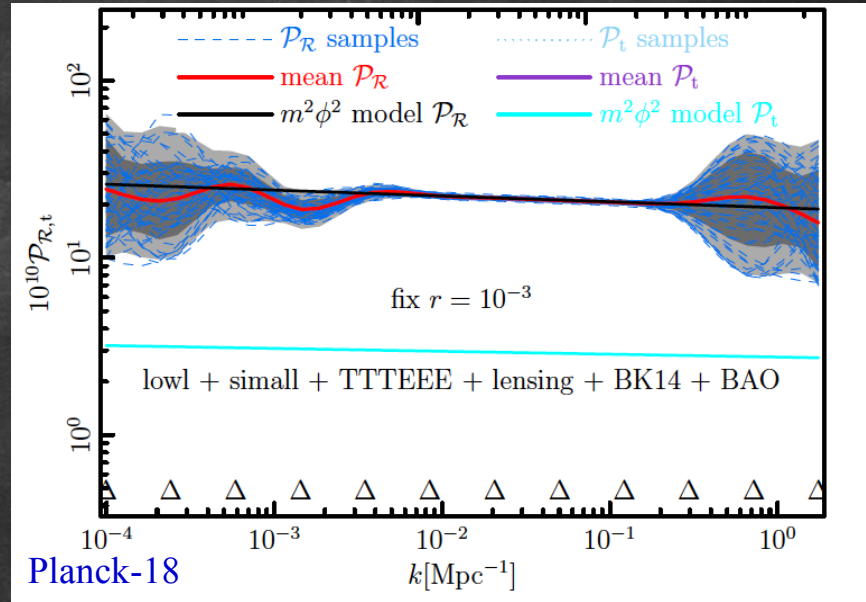
- DM responds to primordial perturbations (matter PS)
- It imprints its own features (interactions, etc.)
- Might even generate additional perturbations
- Smallest dark structures carry invaluable information

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Nature and origin of dark matter

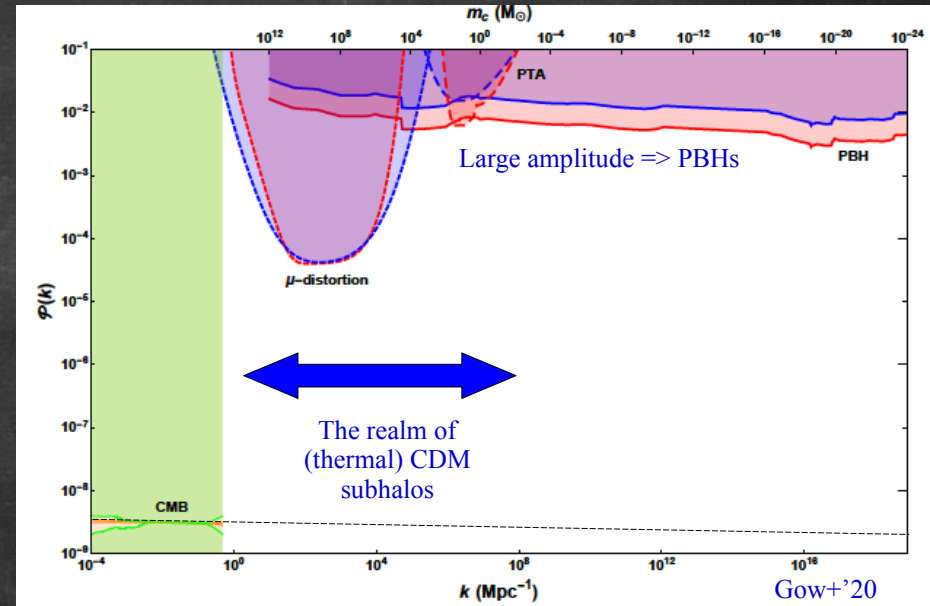
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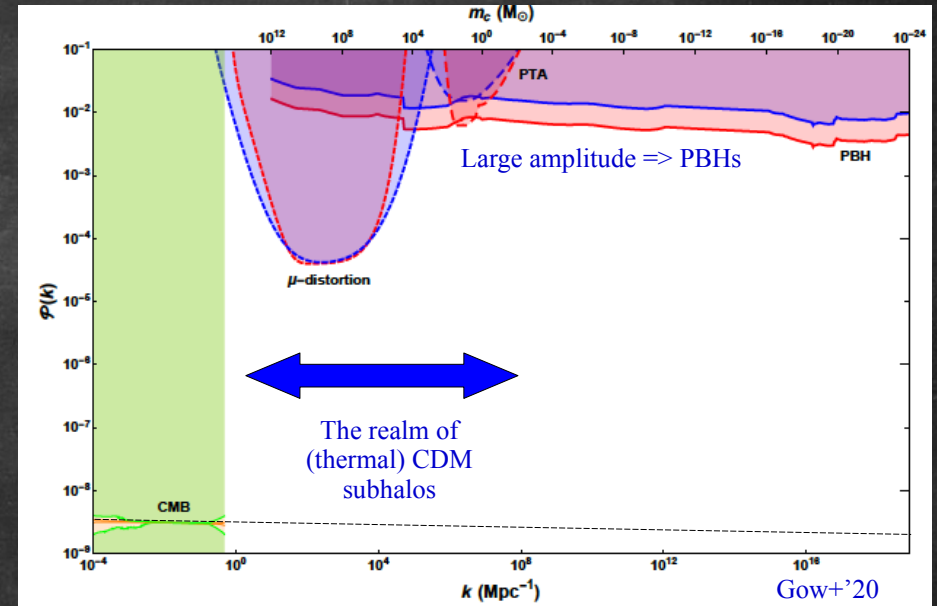
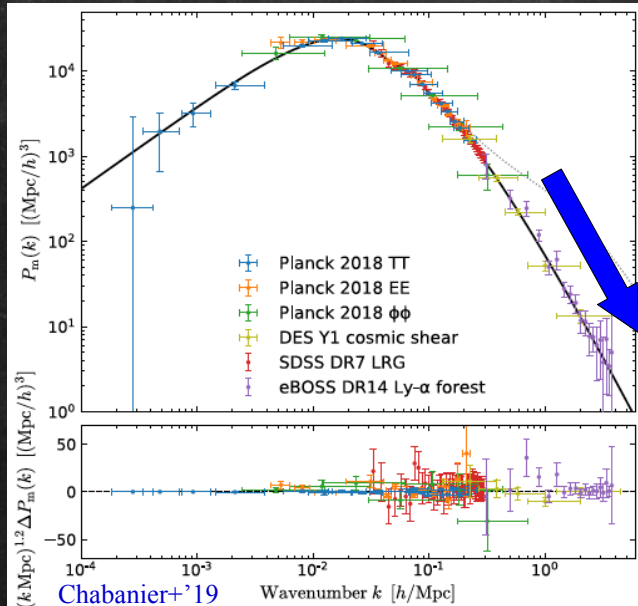
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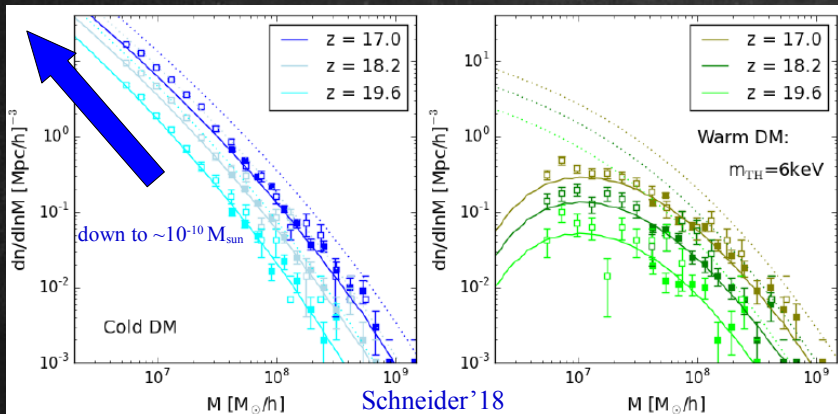
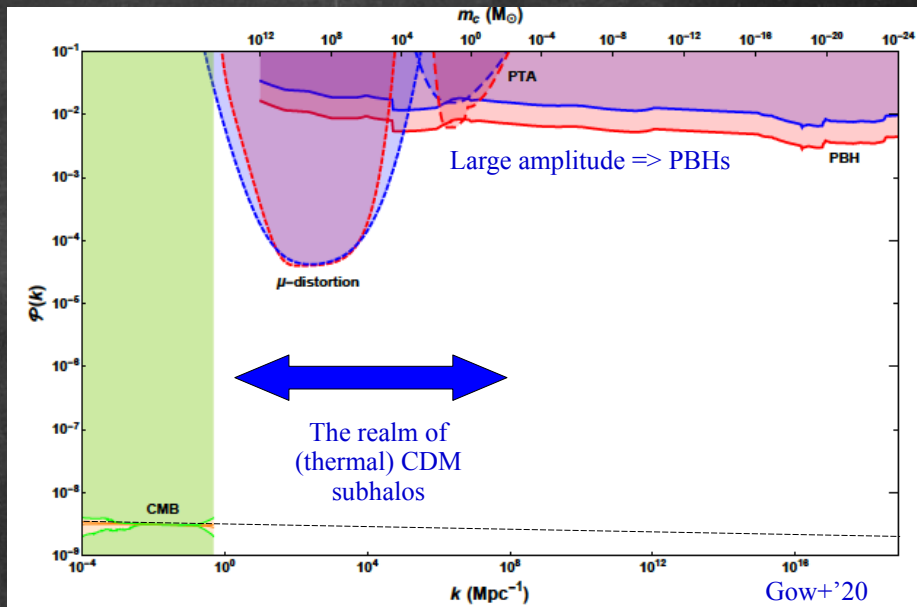
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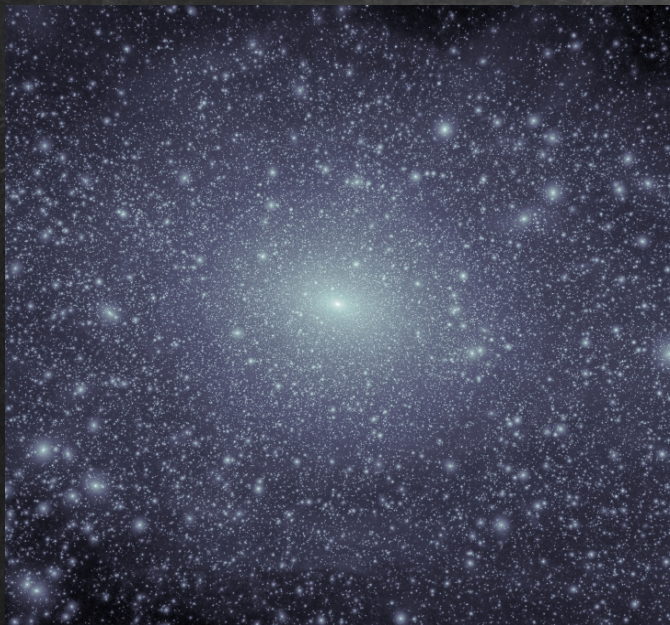
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(C)DM subhalos: should be around



Via Lactea 2 – Diemand+'08

Subhalo populations in galaxies

- Local mass function carries information discussed before
- If DM is cold (of any kind), many subhalos in structures
- Should lead to observational features:
 - gravitational/kinematic (\sim DM candidate independent)
 - other types (DM candidate dependent)
- => Subhalo searches from their effects in galaxies (broad sense)
- => Understanding/modeling of properties evolution/distributions necessary

Several routes to DM subhalos

LCDM in cosmological simulations

→ A status: **Katarina**

Subhalo searches

- Stellar gaps and heating: **Guillaume, Margot**
- Lensing: **Devon, Julien**
- Gamma rays: **Francesca**
- CMB: **Guillermo**

Properties, evolution, modeling

- Stripping: **Asya, (Raphael), Simon, Sten**
- Population models: **Gaétan, Shin'ichiro**
- Ultrafaints: **James**

Impact of DM nature

- PBHs: **Hardi, Sébastien**
- SIDM: **Stacy**
- Axions: **Thomas**

Wednesday Thursday Friday

Rapha (Errani) could not make it :(

Check some of his related posters:

<https://rerrani.github.io/astro.html#EN21>

<https://rerrani.github.io/astro.html#ENIP22>

→ 1st talk of tomorrow morning cancelled:

(1) Start 30 min later

(2) Shift the program backward by one talk=>leave earlier

*** (2) could release pressure to be on time at restaurant

*** up to speakers!

Enjoy!