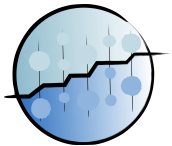


GWHEN analyses @ UCLouvain

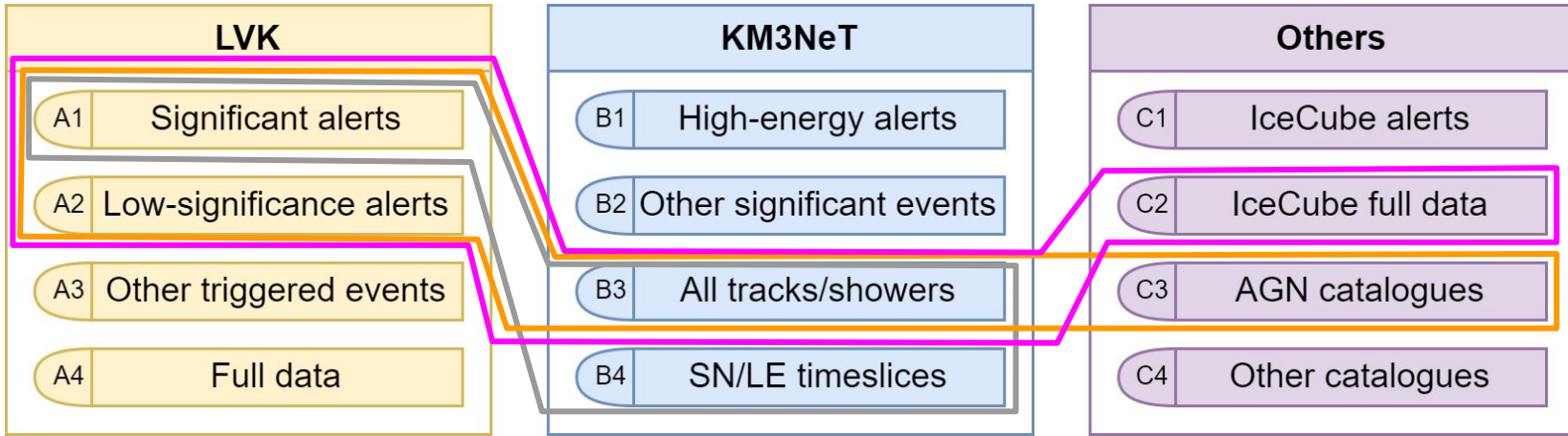
Gwen De Wasseige, Mathieu Lamoureux,
Jonathan Mauro, Marco Scarnera, et al.

2024-10-24



 **UCLouvain**

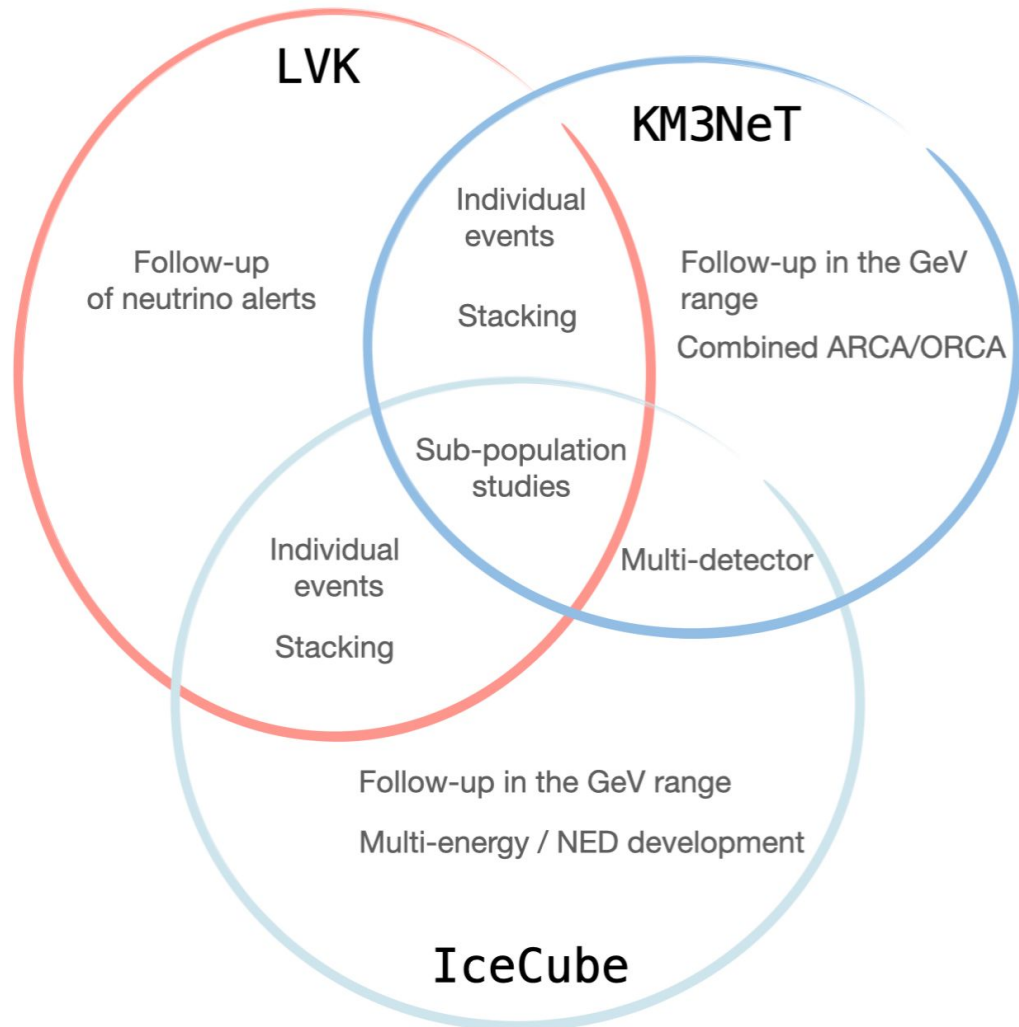


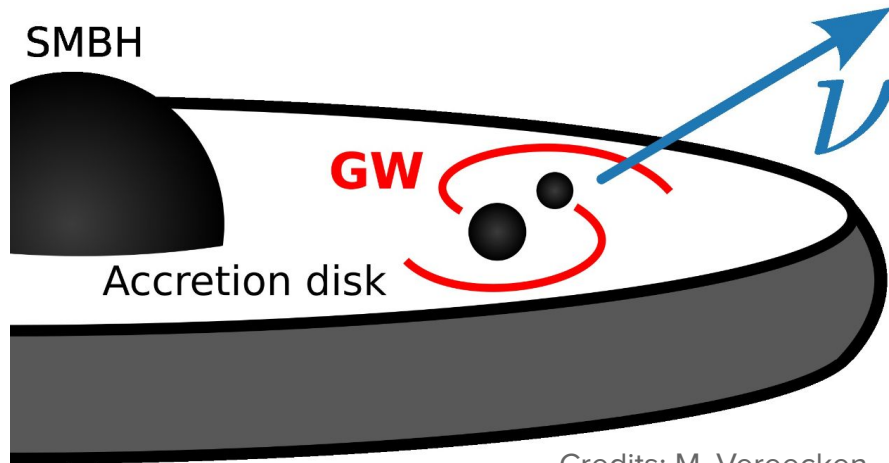


Realtime?



- **A1 + B3-4** → Follow-up of GW alerts with KM3NeT (offline)
- **A1-2 + B3 + C3** → BBH in AGN accretion disks (offline)
- **A1(-2?) + B3 + C2** → Multi-detector and Multi-energy constraints (offline)
- Development towards potential online implementations



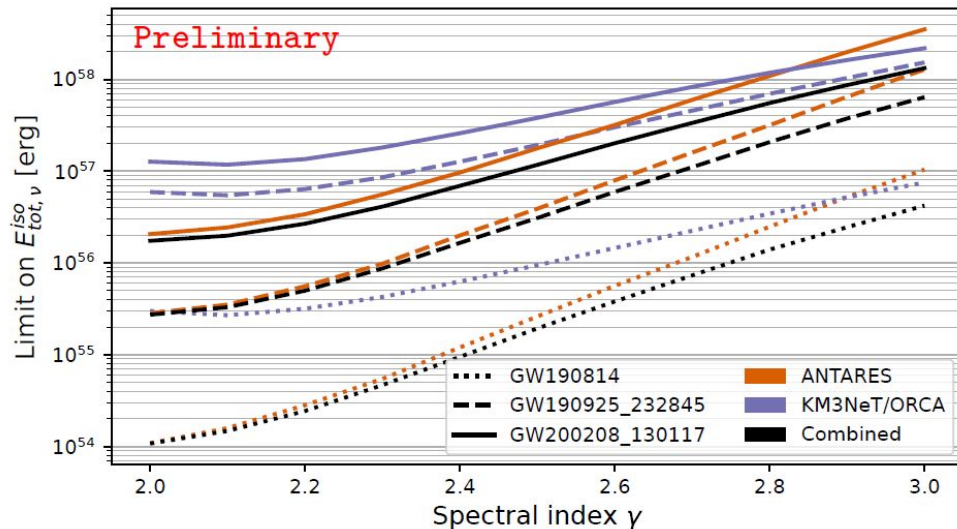


Credits: M. Vereecken

- ❖ Expected neutrino emission
 - BBH clean its environment before merging
 - after merger, final object exits bubble
 - EM and neutrinos on day/week-scale
 - ❖ Three messengers: $X/\gamma + GW + \nu$
 - ❖ Feasibility analysis done with O1-O2 + public IC events + rough AGN catalog made by R. Gorski.
-
- ❖ Ongoing analysis by Matthias and Leonardo:
 - IceCube full data → to be extended to KM3NeT
 - GW high- and low-significance events
 - Proper complete AGN catalogue

Exploit complementarities between samples/experiments (sky cov/energy)

- ❖ Combine observations to constrain neutrino flux, E_ν , f_ν , others (flux shape, jet structure...)
- ❖ Two task forces @UCLouvain: low-level combination and high-level one.
- ❖ Final goal: Combined IceCube + KM3NeT observations for each GW event from MeV to PeV. Collaborating with APC



High-level combination framework status



Code under development.
First version on [GitHub](#).

Features: Observations can be implemented as simple counting or using unbinned likelihood (spatial + energy pdfs) ; neutrino spectrum fully configurable

Ongoing work: adding time pdfs (going beyond ± 500 s) and stacking features

- ❖ Progress to be reported in these regular calls.
- ❖ Regular reports to the KM3NeT-astro meetings.
- ❖ Relevant code / documentation to be shared on Git.
 - New Git group created on IN2P3 Gitlab:
<https://gitlab.in2p3.fr/groups/gwhen/>
 - How to get access:
 - i. Connect directly with your existing CC-IN2P3 account
 - ii. or Connect with EduGAIN and validate your email address and username (may not work)
 - iii. or Create new CC-IN2P3 account (<https://id.cc.in2p3.fr/>, no need to request attachment to a collaboration!)
 - iv. Then, send me a message with your Gitlab username and I will add you

