Kick off Meeting XXXVIII Ciclo 27-10-22

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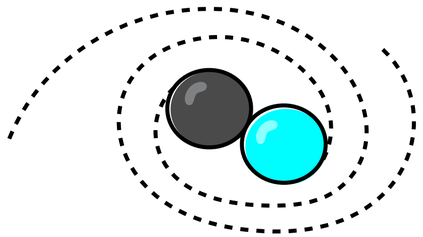
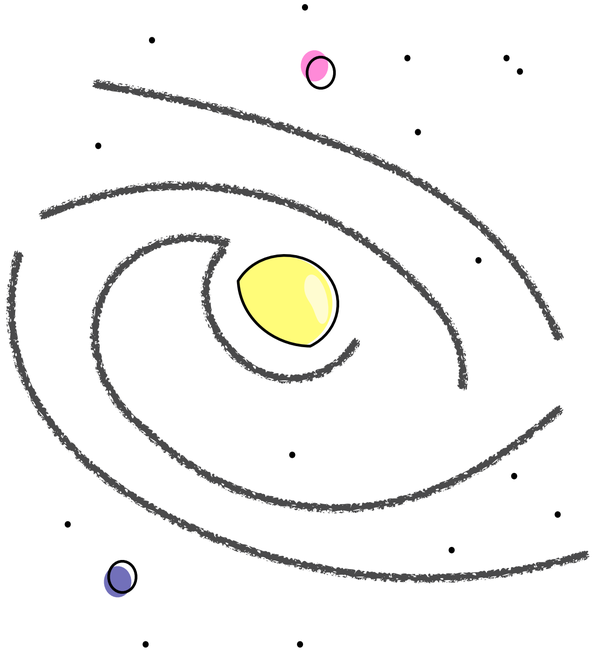
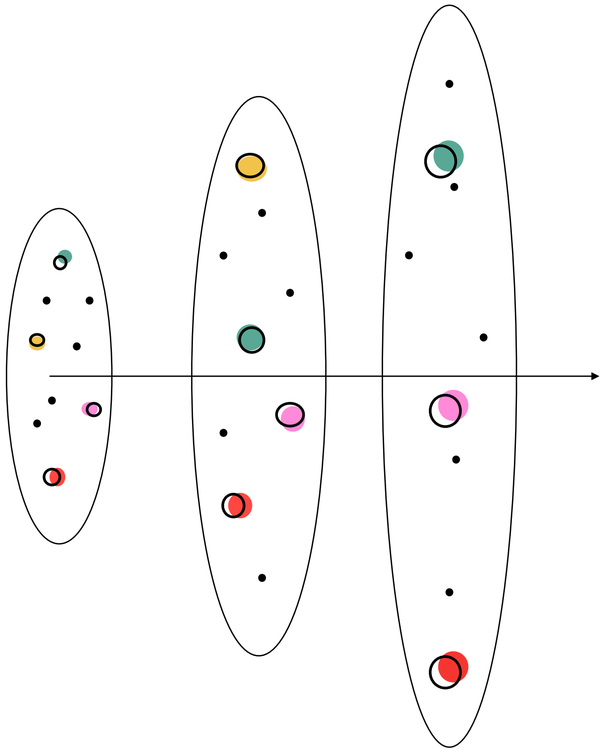
1. Multi-messenger Astronomy with Gravitational Waves (GWs)



SOURCES



ENVIRONMENTS



COSMO

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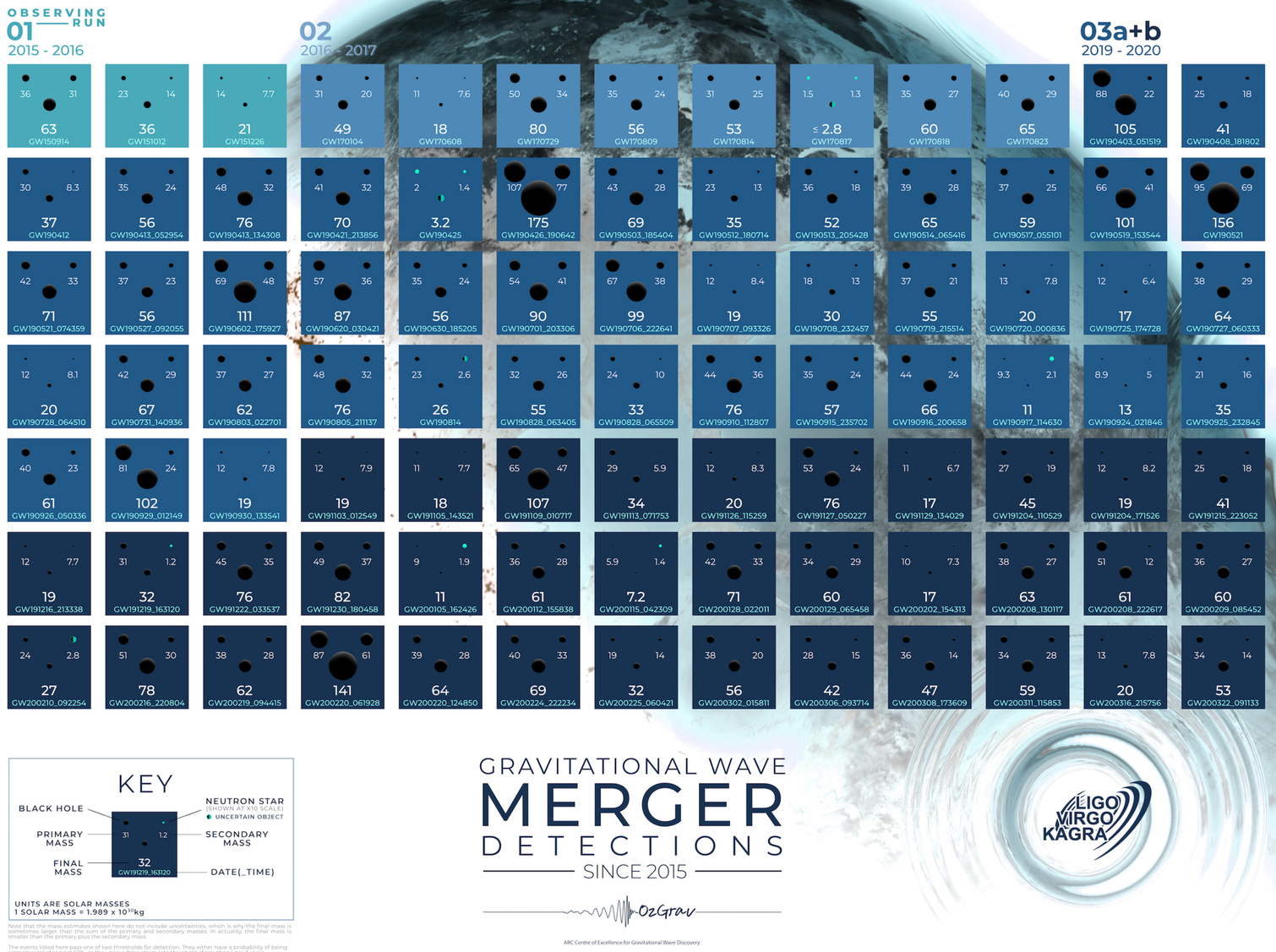

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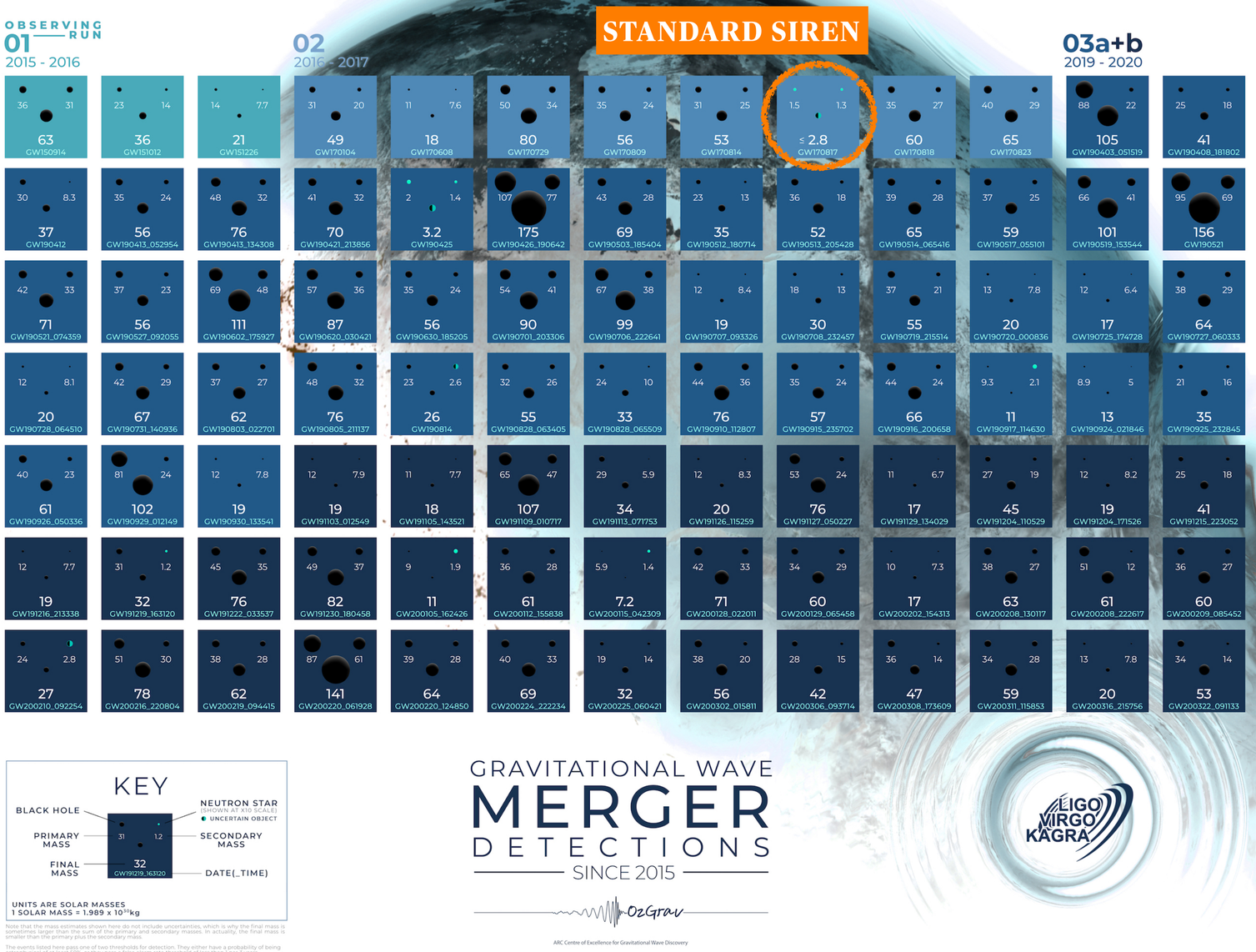

Abbot et. Al,2017

DARK STANDARD SIRENS

- Gravitational Wave events detected without electromagnetic counterpart[8].

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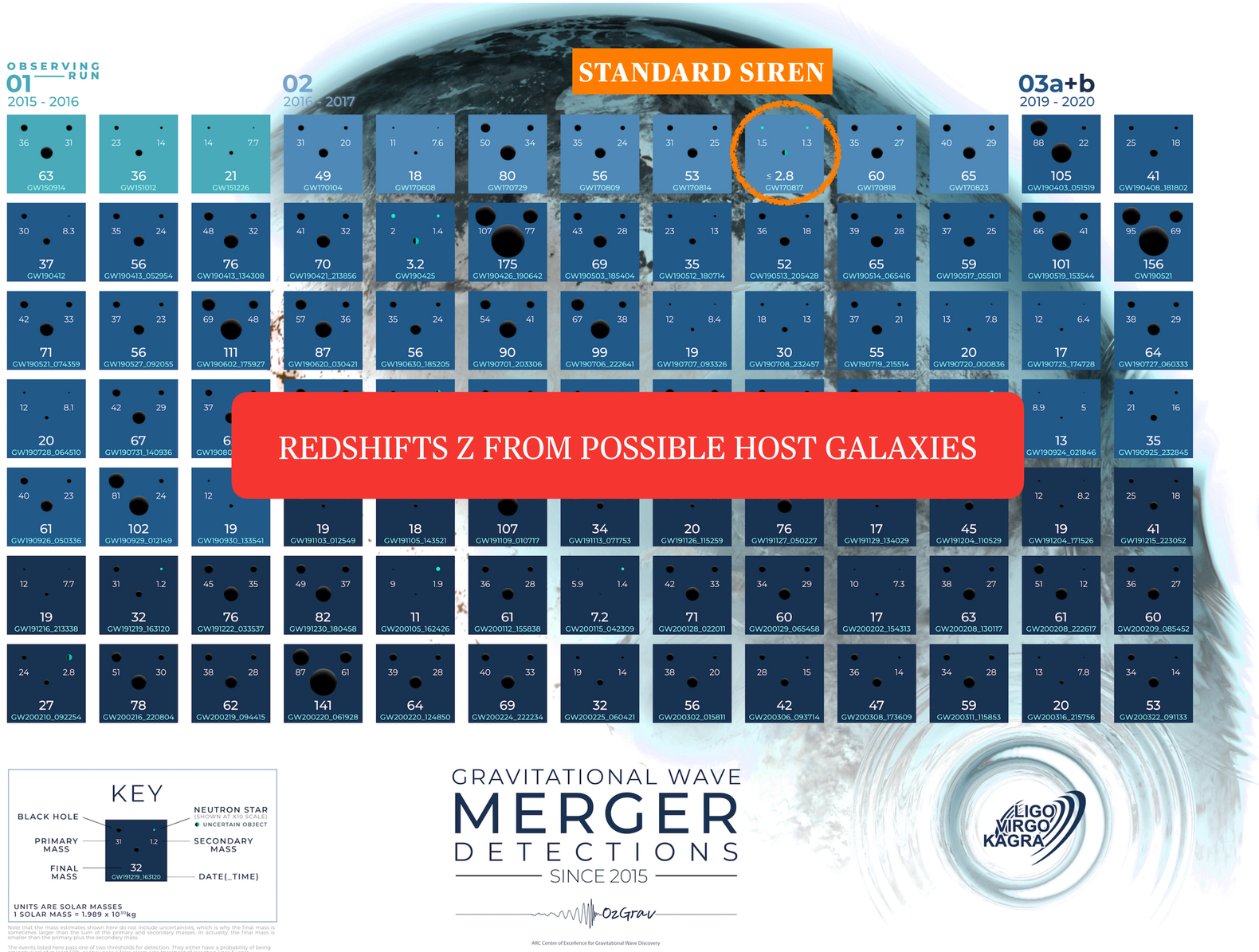

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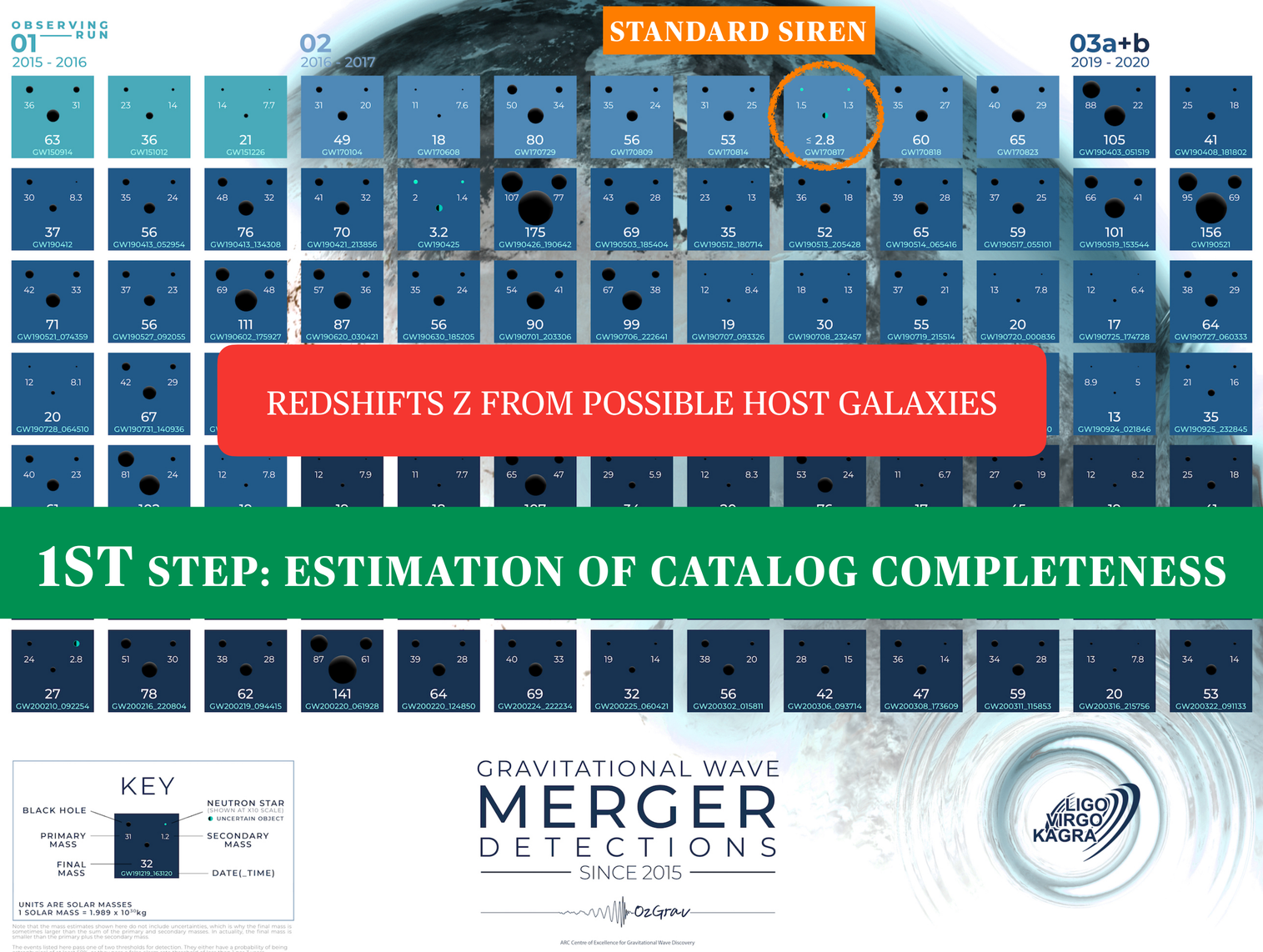

REDSHIFTS Z FROM POSSIBLE HOST GALAXIES

1ST STEP: ESTIMATION OF CATALOG COMPLETENESS

DARK STANDARD SIRENS

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Abbot et. Al,2017

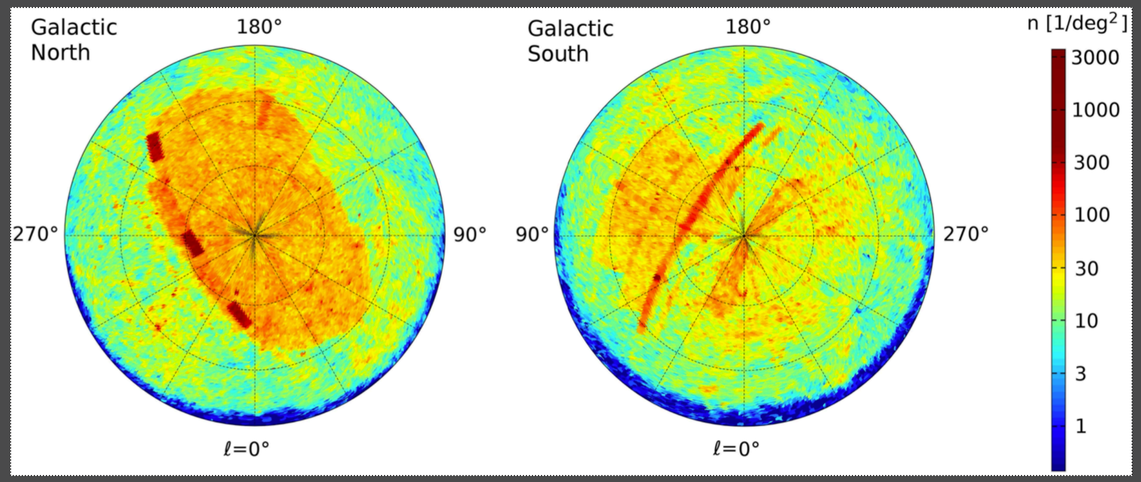
2. Virtual Observatory

- The International **Virtual Observatory Alliance** (IVOA) was born in June 2002.

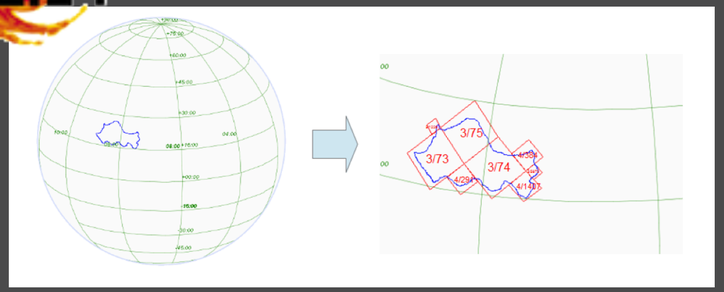
International Virtual Observatory Alliance, https://www.ivoa.net

- *Development and deployment of the **tools, systems and organisational structures** necessary to enable the international utilisation of astronomical archives* as an integrated and interoperating Virtual Observatory (VO);

➡ **STANDARDS** are complaint with **FAIR** (**F**indable **A**ccessible **I**nteroperable **R**eusable)



Dálya, G et al.



2. Completeness Coefficient $\mathscr{C}$

$$\mathscr{C} = \frac{L_{GW}}{L_f}$$

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$$L_f = \int_{x_1}^{\infty} \phi^* L^* x^{(\alpha+1)} exp(-x)\, dx = \phi^* L^* \Gamma(\alpha + 2, x_1)$$

Gehrels et al., AJ, 820:136,2016

$$\phi = \rho_{gal}\, dx = \phi^* x^{\alpha} e^{-x} dx$$

- $\phi^* = (1.6 \pm 0.3) \times 10^{-2} h^3 Mpc^{-3}$
- $x = L/L_B^* \;\; with \;\; L_B^* = (1.2 \pm 0.1) \times 10^{10} h^{-2} L_{B,\odot}$
- $\alpha = -1.07 \pm 0.07$

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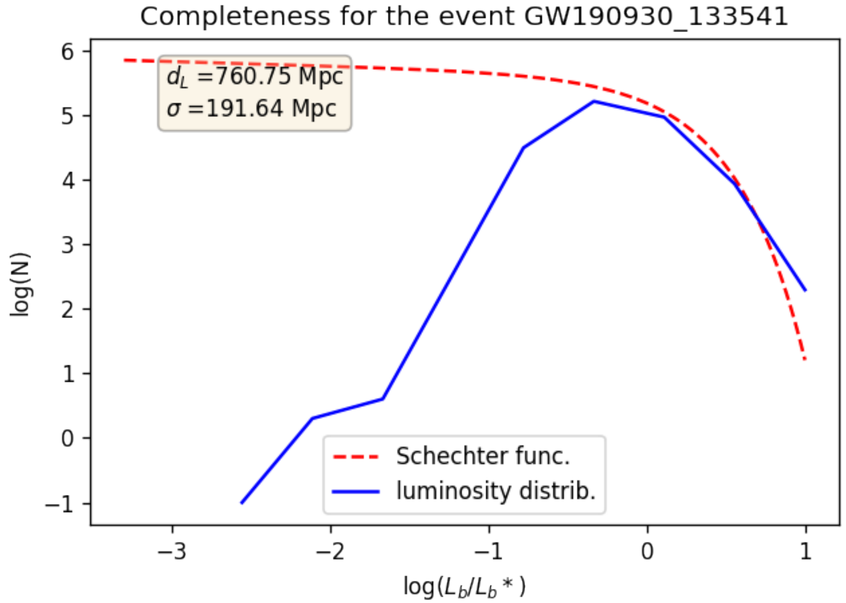

GLADE

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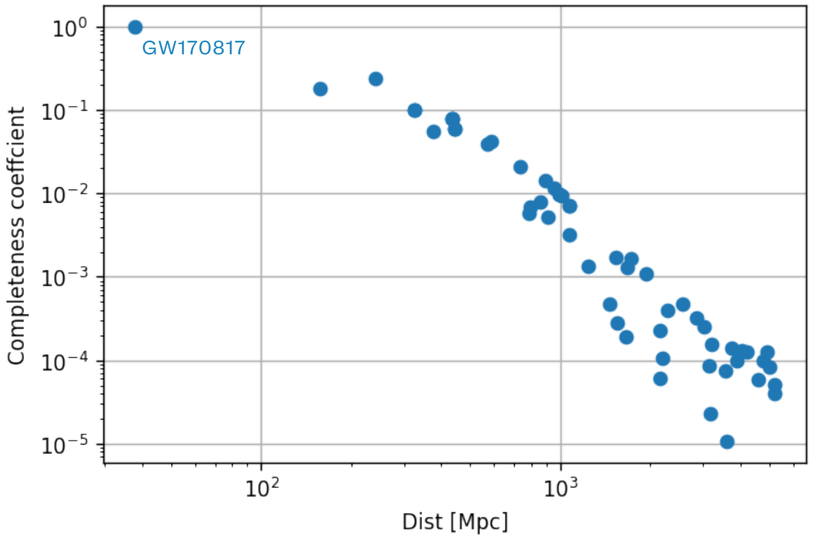
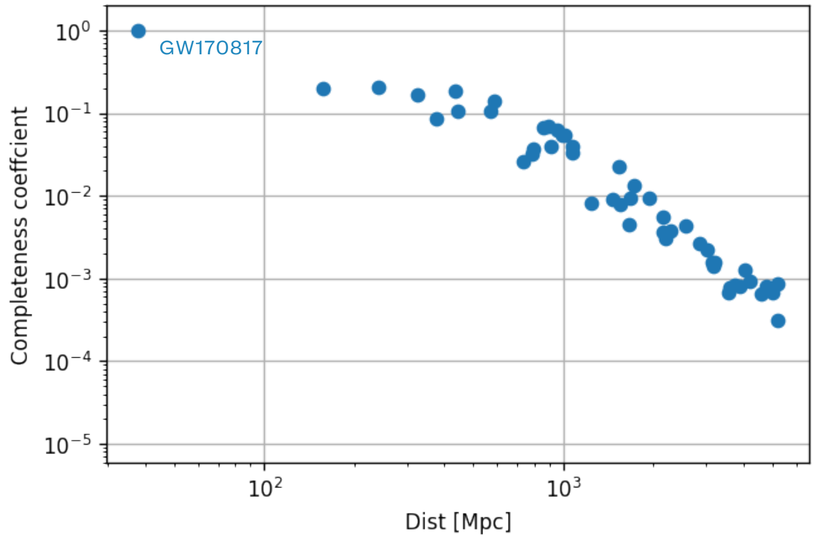
GLADE

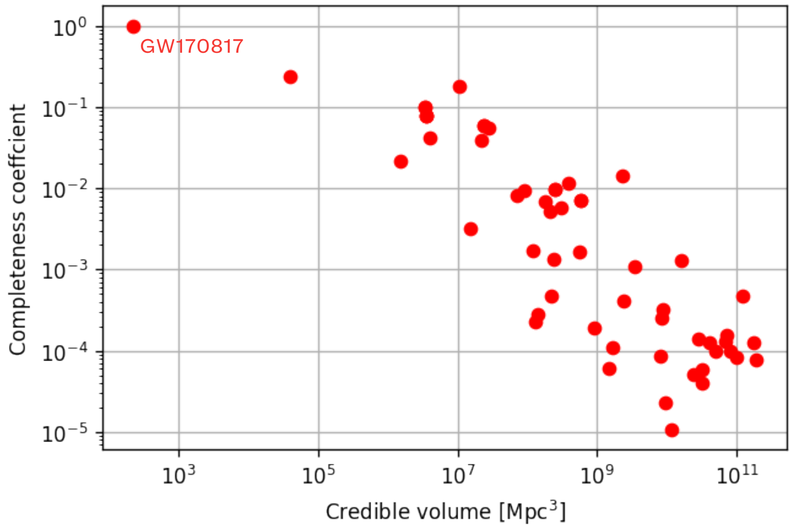
GLADE+

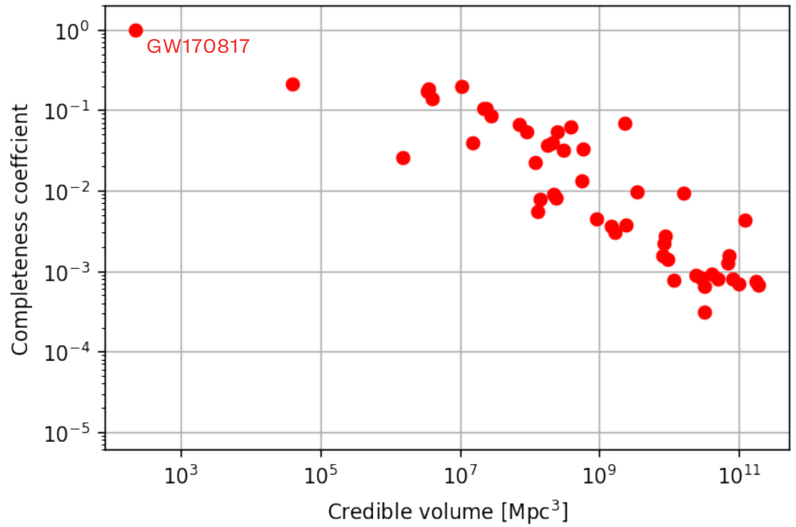
$\mathscr{C}$ vs Luminosity Distance, d_L



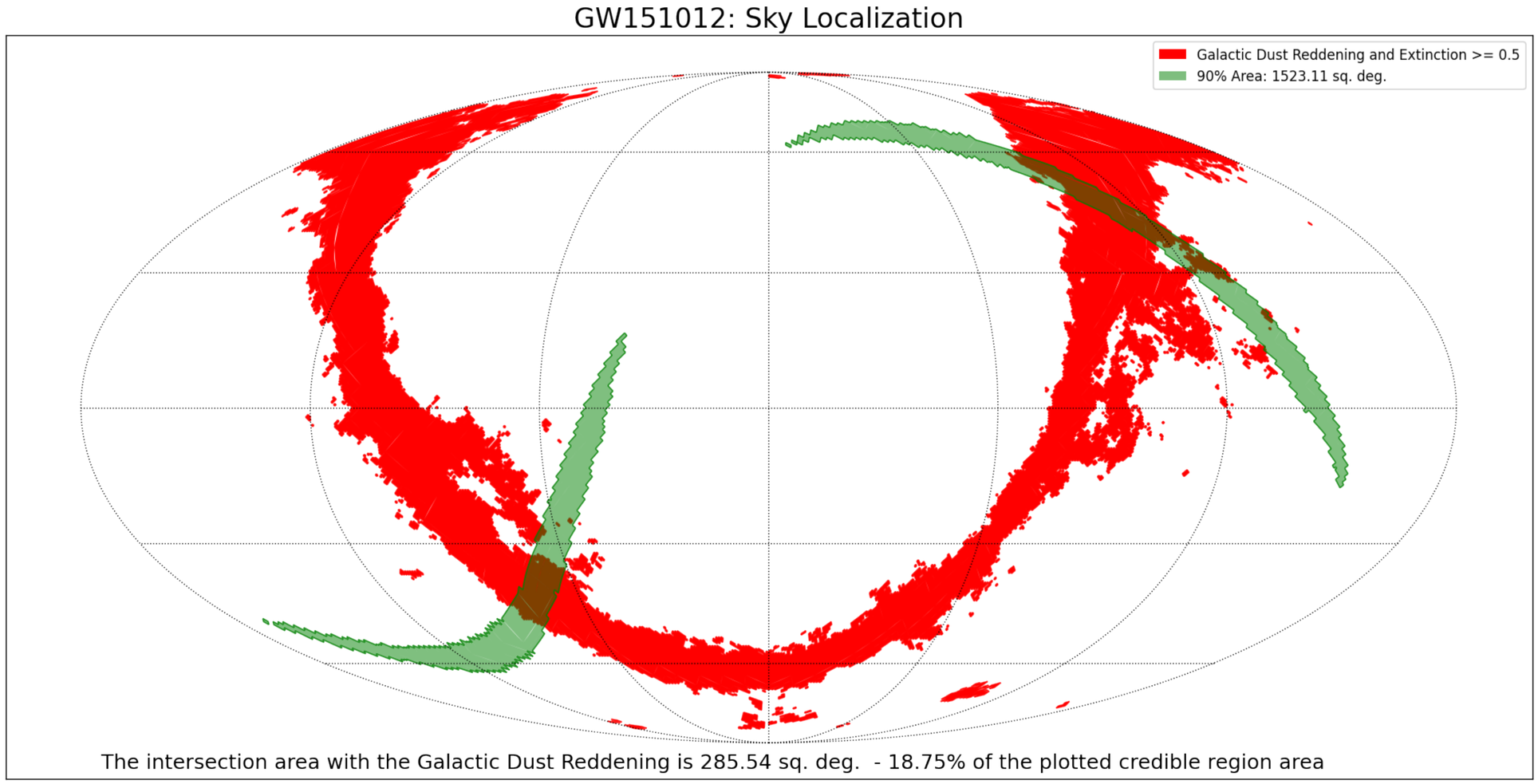


$\mathscr{C}$ vs 3D Volume from GW sky map





2. Intersection Maps



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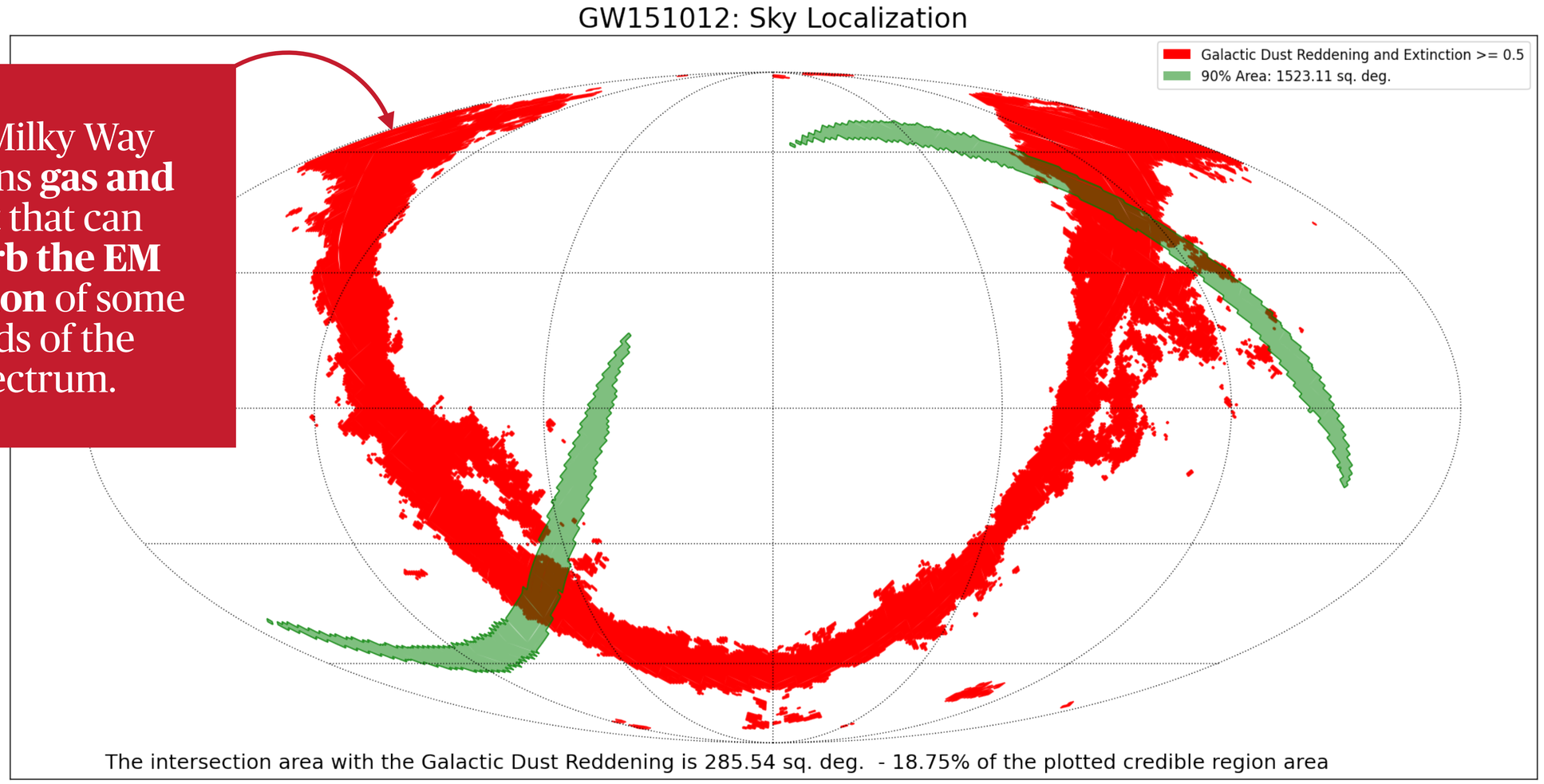
The Milky Way contains **gas and dust** that can **absorb the EM radiation** of some bands of the spectrum.



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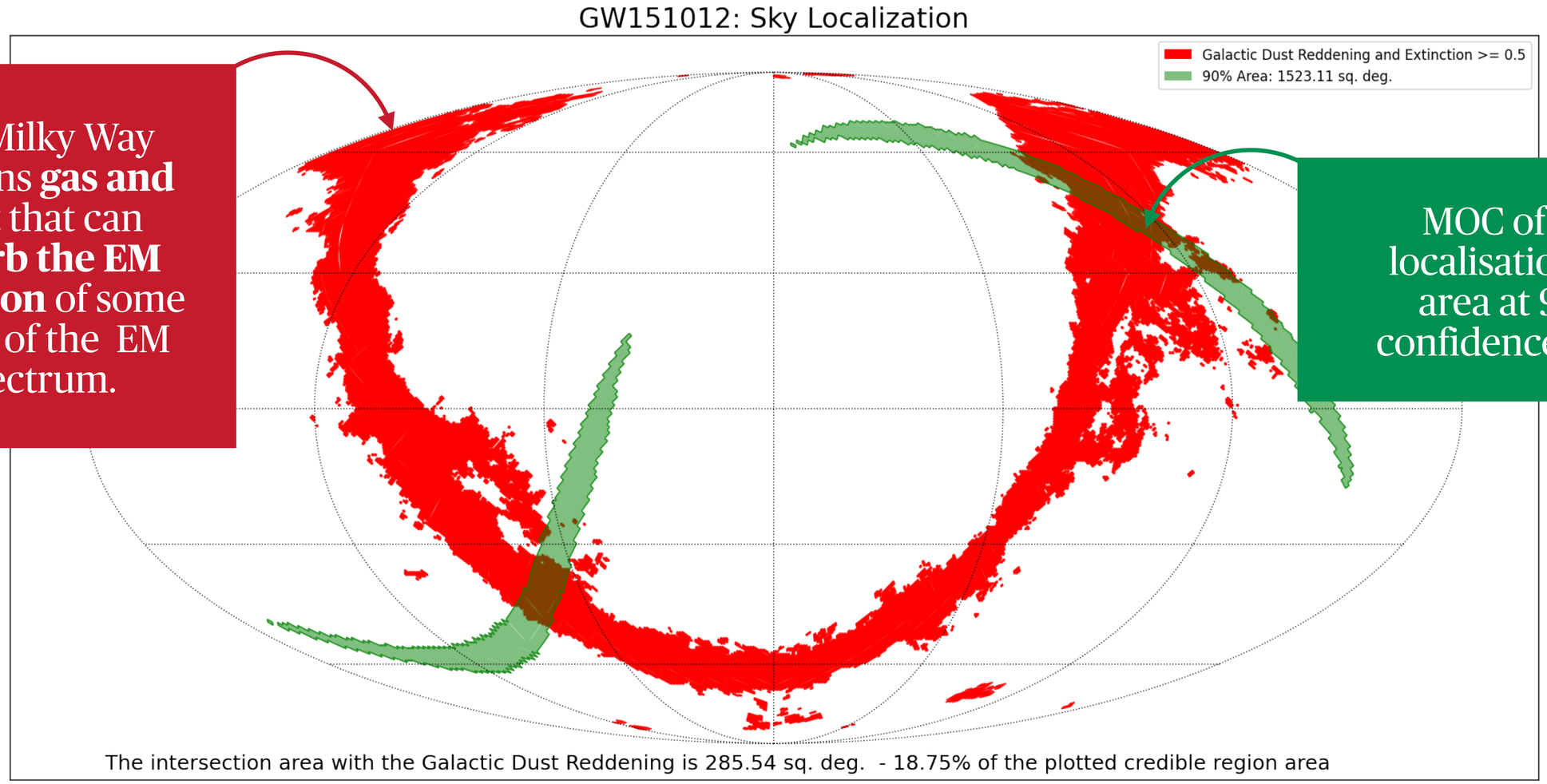

MOC of the localisation sky area at 90% confidence level.

4. Future Goals

GCN

Real time distribution of

- $\mathscr{C}$, m_{th} and maps

H_0

Working with the **GWCOSMO** algorithm to estimate Hubble constant with ***dark standard siren***.

Webtool

Implementation of **web tools** to estimate the cosmological parameters and for multi-messenger activities.


Thanks for attention.