APC GWHEN@KM3NeT Plans
24/10/2024

People :

Pierre-Alexandre Duverne (KM3NeT+LVC), Sonia El Hedri (KM3NeT), Bruny Baret (KM3NeT)

Search's ID card

Type : offline unmodeled* subthreshold

Data:
       HEN : ARCA tracks+showers

       GW : cWB pipeline triggers

Preprocessing: Joint optimisation « à la ANTARES »

Postprocessing: Joint likelihood (position, time, energies)

Outcome: Joint standard candle sources populations
constrains / associations characterisation (if any...)

* as much as possible

Search's ID card

Type : offline unmodeled* subthreshold

Data:

HEN : ARCA tracks+showers

GW : cWB pipeline triggers

Same as ANTARES O1+O2+O3 (re-spin to come)
From ANTARES+O2 dead analysis
Parallel developpement of ANTARES and KM3NeT pipelines

Preprocessing: Joint optimisation « à la ANTARES »

Postprocessing: Joint likelihood (position, time, energies)

Outcome: Joint standard candle sources populations constrains / associations characterisation (if any...)

* as much as possible

Search's ID card

Type : offline unmodeled* subthreshold

Data:

      HEN : ARCA tracks+showers

      GW : cWB pipeline triggers

Coherent Wave Burst :
un-modeled signal serarch
(excess power in phase in diffferent interferometers)
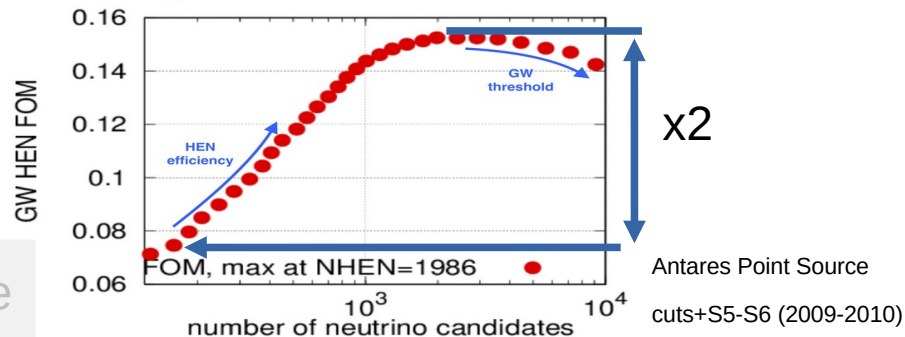
LVCPrivate $\rightarrow$ P.A. in LVC

Preprocessing: Joint optimisation « à la ANTARES »

Postprocessing: Joint likelihood (position, time, energies)

Outcome: Joint standard candle sources populations
constrains / associations characterisation (if any...)

Klimeko et al Class. Quantum Grav. 25 114029 (2008)

* as much as possible

Search's ID card

Preprocessing: Joint optimisation « à la ANTARES »

based on (unpublished) ANTARES+LV(S5-S6)
Maximisation of the number of joint detectable
Standard candles @ given joint F.A.R. :

$$\mathcal{N}_{\text{GWHEN}}(\text{cuts}) = \int dt \, d^3\Omega \, \mathcal{R}(r,t) \varepsilon_\nu(\text{cuts}) \varepsilon_{GW}(\text{cuts}; E_{GW}, r)$$

x2

Antares Point Source
cuts+S5-S6 (2009-2010)

Need for generic HEN source spectrum

* as much as possible

Search's ID card

Type : offline unmodeled* subthreshold

Data:

      HEN : ARCA tracks+showers

      GW : cWB pipeline triggers

Preprocessing: Joint optimisation « à la ANTARES »

Postprocessing: Joint likelihood (position, time, energie

Outcome: Joint standard candle sources populations
constrains / associations characterisation (if any...)

based on (unpublished) ANTARES+LV(S5-S6)
Maximisation of the number of joint detectable
Standard candles @ given joint F.A.R. :

$$\mathcal{N}_{\mathrm{GWHEN}}(\mathrm{cuts}) = \int dt d^3\Omega\, \mathcal{R}(r,t) s_*(\mathrm{cuts}) s_{\mathrm{gw}}(\mathrm{cuts}; E_{\mathrm{gw}}, r)$$

GW HEN FOM

time dependent selection :
      GW-If.s configuration and
efficiency
      HEN efficiency

Diffenrent GW triggers wrt modeled

Much more HEN triggers than
unmodeled triggered search
      → population collective effect

* as much as possible

Search's ID card

Type : offline unmodeled* subthreshold

Data:

      HEN : ARCA tracks+showers

      GW : cWB pipeline triggers

Preprocessing: Joint optimisation « à la ANTARES »

Postprocessing: Joint likelihood (position, time, energies)

Outcome: Joint standard candle sources populations constrains / associations characterisation (if any...)

Similar to all sub-th analyses :
Go for a common one ?

* as much as possible

Search's ID card

Type : offline unmodeled* subthreshold

Data:

    HEN : ARCA tracks+showers

    GW : cWB pipeline triggers

Preprocessing: Joint optimisation « à la ANTARES »

Postprocessing: Joint likelihood (position, time, energies)

Outcome: Joint standard candle sources populations
constrains / associations characterisation (if any...)

Open to collaborate to other searches
Online (PA in GRANDMA)
Definition of candidates for X-pipeline
Physical interpretations and inputs
(e.g. time window)
...

* as much as possible