Table 6. Summary of the expected neutrino interaction rates in the different detectors for a $8M_\odot$ SN located at 10 kpc (Galactic center). The following notations have been used: IBD, eES and pES stand for Inverse Beta Decay, electron and proton Elastic Scattering, respectively. The final state nuclei are generally unstable and decay either radiatively (notation *), or by β^-/β^+ weak interaction (notation $^{\beta^-,+}$). The rates of the different reaction channels are listed, and for LENA they have been obtained by scaling the predicted rates from [65, 66].

MEMPHYS		LENA		GLACIER	
Interaction	Rates	Interaction	Rates	Interaction	Rates
$\bar\nu_e$ IβD	2×10^5	$\bar\nu_e$ IβD	9×10^3	$\nu_e^{CC}(^{40}Ar,{}^{40}K^*)$	2.5×10^4
$\overset{(-)}{\nu}{}_e^{CC}(^{16}O,X)$	10^4	ν_x pES	7×10^3	$\nu_x^{NC}(^{40}Ar^*)$	3.0×10^4
ν_x eES	10^3	$\nu_x^{NC}(^{12}C^*)$	3×10^3	ν_x eES	10^3
		ν_x eES	600	$\bar\nu_e^{CC}(^{40}Ar,{}^{40}Cl^*)$	540
		$\bar\nu_e^{CC}(^{12}C,{}^{12}B^{\beta^+})$	500		
		$\nu_e^{CC}(^{12}C,{}^{12}N^{\beta^-})$	85		
Neutronization Burst rates					
MEMPHYS	60	ν_e eES			
LENA	70	ν_e eES/pES			
GLACIER	380	$\nu_x^{NC}(^{40}Ar^*)$			

to all neutrino flavours, would give information on the total flux. GLACIER has also the opportunity to detect ν_e by charged-current interactions on ^{40}Ar with a very low energy threshold. The detection complementarity between ν_e and $\bar\nu_e$ is of great interest and would assure a unique way of probing the SN explosion mechanism as well as assessing intrinsic neutrino properties. Moreover, the huge statistics would allow spectral studies in time and in energy domain.

We wish to stress that it will be difficult to establish SN neutrino oscillation effects solely on the basis of a $\bar\nu_e$ or ν_e spectral hardening, relative to theoretical expectations. Therefore, in the recent literature the importance of model-independent signatures has been emphasized. Here we focus mainly on signatures associated to the prompt ν_e neutronization burst, the shock-wave propagation and the Earth matter crossing.

The analysis of the time structure of the SN signal during the first few tens of milliseconds after the core bounce can provide a clean indication if the full ν_e burst is present or absent, and therefore allows distinguishing between different mixing scenarios, as indicated by the third column of Tab. 7. For example, if the mass ordering is normal and θ_{13} is large, the ν_e burst will fully oscillate into ν_x. If θ_{13} turns out to be relatively large one could be able to distinguish between normal and inverted mass hierarchy.

As discussed above, MEMPHYS is mostly sensitive to the IBD, although the ν_e channel can be measured by the elastic scattering reaction $\nu_x + e^- \to e^- + \nu_x$ [67]. Of course, the identification of the neutronization burst is the cleanest with a detector exploiting the charged-current absorption of ν_e neutrinos, such as GLACIER. Using its unique features of measuring ν_e CC events it is possible to probe oscillation physics during the early stage of the SN explosion, while with NC events one can decouple the SN mechanism from the oscillation physics [68, 69].

A few seconds after core bounce, the SN shock wave will pass the density region