$$G_{\mu\nu} - \Lambda g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}$$

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Presence of a third body orbiting around XB 1916-053.

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The ultra-compact dipping source XB 1916-053 has an orbital period of
close to 50 min and a companion star with a very low mass (less
than 0.1 M$_\odot$). The known orbital period derivative
$(1.5(3) \times 10^{-11}$ s/s) is extremely large and can be
explained by invoking an extreme, non-conservative mass transfer
rate that is not
easily justifiable. We extended the analysed data
from 1978 to 2014, by spanning 37 years, to verify whether a
larger sample of data can be fitted with a quadratic term or a
different scenario has to be considered. The 27 delays associated with the dip arrival times are well fitted using
a sinusoidal term plus a quadratic function
or, alternatively, with a series of sinusoidal terms that can be
associated with a modulation of the dip arrival times due to the
presence of a third body that has an elliptical orbit. We infer
that for a conservative mass transfer scenario the modulation of the
delays can be explained by invoking the presence of a third body with
mass between 0.10-0.14 M$_\odot$,
orbital period around the X-ray binary system of close to 51 yr
and an eccentricity of 0.28 ± 0.15.
In a non-conservative mass transfer scenario we estimate that the
fraction of matter yielded by the degenerate companion star and
accreted onto the neutron star is $\beta = 0.08$, the neutron star
mass is ≥ 2.2 M$_\odot$, and the companion star mass is 0.028 M$_\odot$.
In this case, we explain the sinusoidal modulation of the delays by
invoking the presence of a third body with orbital period of 26 yr and
mass of 0.055 M$_\odot$. From the analysis of the delays,
we find that both in a conservative and non-conservative mass transfer
scenario we have to invoke the presence of a third
body to explain the observed sinusoidal modulation.
We propose that XB 1916-053
forms a hierarchical triple system.

Primary author: Prof. IARIA, Rosario (Univ. di Palermo - DSFC)

Co-authors: Dr RIGGIO, Alessandro (Univ. di Cagliari); Dr SANNA, Andrea (Univ. di Cagliari); Mr GAMBINO, Angelo Francesco (Univ. di Palermo); Mrs SCARANO, Fabiana (Univ. di Cagliari); Dr PINTORE, Fabio (Univ. di Cagliari); Prof. BURDERI, Luciano (Univ. di Cagliari); Prof. DI SALVO, Tiziana (Univ. di Palermo - DSFC); Dr MATRANGA, marco (Univ. di Palermo - DSFC)

Presenter: Prof. IARIA, Rosario (Univ. di Palermo - DSFC)

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