Curriculum vitae
Name: Gian Luca ISRAEL

PERSONAL DATA

Family name: ISRAEL *Forename: GIAN LUCA*
ID/Passport no: A546276 *Date of birth : 02/08/1965* *Gender: M*
Nacionality: ITALIAN

PRESENT PROFESIONAL POSITION

Institution: ISTITUTO NAZIONALE DI ASTROFISICA (INAF)
Faculty, School or Institute:
Department: : ASTRONOMICAL OBSERVATORY OF ROME
Address: Via Frascati 33, I-00040 Monte Porzio Catone
Country: Italy

Telephone (indicate prefix, number and extension): +390694286437
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E-mail: gianluca@oa-roma.inaf.it

Profesional status: ***Associate Astronomer*** *Start date: 01/11/2006*

Administrative status:
X Staff Position holder
X Full-time

PRESENT RESEARCH AREA

Dr. GianLuca Israel, has been staff astronomer at the Astronomical Observatory of Rome since 1999, and Associate Professor since 2006. He has a long standing experience on high-energy observations with Einstein, EXOSAT, ASCA, BeppoSAX, RossiXTE, Chandra and XMM-Newton, and he is part of the Swift team. He actively contributed to the development of the timing analysis package software XRONOS, currently available and distributed in FTOOLS (one of the main standards for high energy data analysis). His main field of research is on observations and modelling/interpretation of multi-wavelength properties of compact objects. More in particular, he worked since the very beginning in the magnetar field. Magnetars are isolated neutron stars which shine mainly at high energies (X- and γ-rays). These sources are currently believed to be the strongest magnets in the cosmos, hosting NSs with a magnetic field as large as B~10^{14}- 10^{15} G. Among others results he takes part to the identification of the Anomalous X-ray Pulsars as a distinct class of high energy pulsars, detected quasi periodic oscillations at ms and sub-ms time-scales during the Giant Flare of Soft Gamma-ray Repeaters likely testifying of global seismic oscillations on the surface of the neutron star (similar to those detected on the Earth during strong earthquakes), and the study of the outbursts of the first transient AXPs. Dr. GianLuca Israel is also actively involved in the study of γ-ray bursts (GRBs) from

an observationl point of view. Among other fields of interests are: (i) the study of a sub-class of double degenerate binary systems hosting two white dwarfs, also known as AM Cvn systems (he discovered the system with the shortest known orbital period, only 321.5s period), (ii) the development of new algorithms for the detection of periodic and quasi-periodic signals in the power spectra of high energy sources, (iii) the systematic search for new pulsators in the public archival datasets of all present and past high energy missions, (iv) the study of accretion mechanisms in accreting compact objects, (v) and the development and exploitation of the next generation IR instruments based on multi-coniugate adaptive optics.

ACADEMIC BACKGROUND

Bachelor	*Centre*	*Date*
Laurea in Physics (grade 110/110)	*University of Rome "La Sapienza", Porf. Remo Ruffini and Luigi Stella*	*28/05/1992*

Ph.D.	*Centre*	*Thesis Supervisor*	*Date*
Astrophysics	*International School for Advanced Studies (SISSA-ISAS), Tireste, Italy*	*Prof. Aldo Treves Prof. Luigi Stella*	*28/10/1996*

SCIENTIFIC EXPERIENCE

Position	*R&D Centre*	*Institution*	*Start date*	*End date*
Graduate Fellowship	*International Center for Relativistic Astrophysics (ICRA)*	*ICRA/University of Rome*	*01/10/1992*	*31/09/1993*
Post-Doc Fellowship	*High Energy Division*	*INAF/Astronomical Observatory of Rome*	*01/04/1997*	*31/08/1998*
Research Astronomer	*High Energy Division*	*INAF/Astronomical Observatory of Rome*	*01/09/1998*	*31/10/06*

Position	*R&D Centre*	*Institution*	*Start date*	*End date*
Visiting Professor	*ESO Santiago (Chile)*	*European Southern Observatory*	*Jan-2001*	*Mar-2010*
Visiting Professor	*ESO Santiago (Chile)*	*European Southern Observatory*	*Feb-2003*	*Mar-2003*
Visiting Professor	*ESO Santiago (Chile)*	*European Southern Observatory*	*Jan-2006*	*Mar-2006*
Visiting Professor	*ESO Santiago (Chile)*	*European Southern Observatory*	*Jan-2001*	*Mar-2010*

DIDACTIC EXPERIENCE

Course	*R&D Centre*	*Institution*	*Academic year*
High Energy Astrophysics	*Physics Department*	*Univ. Roma "Tor Vergata"*	*2009/10*
High Energy Astrophysics	*Physics Department*	*Univ. Roma "Tor Vergata"*	*2008/09*
Compact Objects (PhD level)	*NATO Advanced Study Institute (ASI)*	*Marmaris (Turkey)*	*June 2004*
Compact Objects (PhD level)	*Physics Department*	*Univ. Roma III*	*2002/03*
Compact Objects (PhD level)	*Physics Department*	*Univ. Roma III*	*2001/02*

PUBLICATIONS

- *Gian Luca Israel has published more than 170 referred papers on international Journals, more than 30 of which as first authors.*
- *Moreover, he has published about 230 papers among non referred journals, proceedings and short communications.*
- *The above papers (both referred and not) have been cited more than 2000 times (excluding self-citations)*

MOST OUTSTANDING PUBLICATIONS

AUTHORS: Israel, G.L., at al.
TITLE: The Discovery of Rapid X-Ray Oscillations in the Tail of the SGR 1806-20 Hyperflare
JOURNAL/BOOK TITLE: The Astrophysical Journal
DATE OF PUBLICATION: 628, L53 (2005)
MOST NOTABLE ASPECTS: A very important result was reported in this Letter concerning the detection, for the first time in a neutron star, of quasi periodic oscillations (QPOs) at about 11ms during a X-ray Giant Flare (a short and intense emission phenomena during which approximatively 10^{47} ergs were released in less than 1 second) from SGR1806-20 in 2004. Such signal, subsequentely confirmed by

other high energy satellites, represents the first direct signature of the presence of global seismic oscillations on the neutron star surface. Interestingly, the detected QPOs have been found to violate the severe Cavallo-Fabian-Rees limit: the only way to circumvent this limit is to assume a surface magnetic field larger than 10^15 G (Vietri, Stella, Israel, 2007, ApJ, 661, 1089). This high magnetic field naturally implies shape deformations (from newly born magnetars), which is thought to originates a gravitational wave (GW) signal detectable with Advanced Virgo/LIGO-class interferometers from much further away, up to the distance of the Virgo cluster (Stella Dall'Osso, Israel & Vecchio 2005, ApJ, 634, L165). An infrared monitoring of the region of the sky including the X-ray/radio position of SGR1806-20 before and after the Giant Flare allowed us to identify the IR counterpart, the first ever for a SGR (Israel et al. 2005, A&A, 438, L1).

AUTHORS: Israel, G.L., et al.
TITLE: RX J0806.3+1527: A double degenerate binary with the shortest known orbital period (321s)
JOURNAL/BOOK TITLE: Astronomy & Astrophysics
DATE OF PUBLICATION: 386, L13 (2002)
MOST NOTABLE ASPECTS: A very important result is reported in this paper and in the subsequent theoretical papers. It is concerning the study of a subclass of double degenerate systems, known as AM Cvns, X-ray-quiet systems in which mass is transferred from a Roche lobe filling white dwarf to amore massive one. AM CVns are expected to originate from normal composition binaries which have experienced two phases of mass exchange. We identified the X-ray pulsating source RX J0806.3+1527 as a double degenerate system with the shortest orbital period (321s) binary known. The study of this ultrashort orbital period system is especially interesting in relation to the fact it is expected to be one of the strongest emitters of low frequency gravitational waves (GW) easily detectable by LISA. The source was found to be decreasing its period at a rate of about 1 ms/yr (Israel et al. 2004, Mem.S.A.It., 5, 148). This results is somewhat unexpected, under the hypothesis that the gravitational wave emissions is the main channel governing the period evolution. In fact this finding have led strong support to non-standard scenarios for the interpretation of this peculiar objects. In particular, we have considerably developed the alternative scenario of the Unipolar Inductor Model (UIM), previously proposed by others in a preliminary form (Dall'Osso, Israel, Stella 2006, A&A, 447, 785 ; 2007, A&A, 464, 417). The model envisages a flow of electric currents between the two component stars, currents induced by a magnetic interaction between two white dwarfs and confined to flow a long the sides of the flux tube connecting them. Currents are strongly dissipated in the atmosphere of the primary star, thus producing the observed soft X-ray emission. The work has shown that the strong GW emission expected from such close binaries can introduce a further term in the electric circuit: while electric energy is dissipated by atmospheric currents in the primary and eventually converted (in part) to heat and X-ray emission, GW emission continuously feeds the circuit as the system shrinks. Therefore the circuit keeps working at a rate that is fixed by the rate at which GWs are emitted.

AUTHORS: Israel, G.L., et al.
TITLE: A Swift Gaze into the 2006 March 29 Burst Forest of SGR 1900+14
JOURNAL/BOOK TITLE: The Astrophysical Journal
DATE OF PUBLICATION: 685, 1114 (2008)
MOST NOTABLE ASPECTS: In 2006 March the Soft Gamma-ray Repeater SGR 1900+14 resumed its bursting activity after about 2 years of quiescence. In this paper

is reported the detection and detailed analysis of the intense burst ``forest'' recorded by Swift on 2006 March 29 which lasted for 30s. More than 40 bursts were detected, seven of which are rare intermediate flares (IFs): several times 10^{42} ergs were released. The Swift data were used to carry out, for the first time for a SGR, a time-resolved spectroscopy in the 14-100keV range down to 4ms timescales. This unique dataset allowed, for the first time, to test the magnetar model predictions such as the magnetically trapped fireball and the twisted magnetosphere over an unprecedented range of fluxes and with large statistics, both in terms of photons and number of IFs. Within the two black body model the following properties were inferred: i) a change of behavior, around 10^{41} ergs, above which the softer blackbody shows a sort of qsaturation while the harder one still grows to a few times 10^{41} ergs; ii) a rather sharp correlation between temperature and radii of the blackbodies ($R^2 \propto kT^{-3}$), which holds for the most luminous parts of the flares ($L_{tot} > 10^{41}$ ergs). Within the magnetar model, the majority of these findings can be accounted for in terms of thermalised emission from the E-mode and O-mode photospheres. Interestingly, the maximum observed luminosity coming from a region of 15km matches the magnetic Eddington luminosity at the same radius, for a surface dipole field of about 8 x 10^{14} G (virtually equal to the one deduced from the spindown of SGR 1900+14).

AUTHORS: Israel, G. L., et al.
TITLE: The Post-Burst Awakening of the Anomalous X-Ray Pulsar in Westerlund 1
JOURNAL/BOOK TITLE: The Astrophysical Journal
DATE OF PUBLICATION: 664, 448 (2007)
MOST NOTABLE ASPECTS: A few AXPs were recently discovered to possess transient activity on timescales of months to years. During quiescence their persistent emission level was at least two orders of magnitude fainter than in the active state. This finding opened a new perspective in magnetars studies, suggesting the presence of a number of dormant, still undetected, objects. Some of them may have already been detected, and not recognized, by past observations. Transient magnetars are especially important in two respects: a) their number has potentially important consequences on the incidence of magnetars in the total population of neutron stars that are born in the Galaxy; b) by studying them throughout their outbursts it will be possible to study how their properties change over a large range of luminosity. CXOU J164710.2-455216 entered in an outburst phase in September 2006 and was the second confirmed transient AXP, the first for which it has been possible to monitor the spectral and timing variability since the very beginning of the outburst. This paper reports the results obtianed from the detailed analysis of Swift, XMM and Chandra observations during the first five months. Among other results is the detection, in the evolution of the pulse phases, of an exponential component decaying with timescale of 1.4 days, which was interpret as the recovery stage following a large glitch ($\Delta\nu/\nu \sim 6\times10^{-5}$), the largest ever detected in a neutron star.

AUTHORS: Israel, G. L., et al.
TITLE: The discovery of 8.7 second pulsations from the ultrasoft X-ray source 4U 0142+61
JOURNAL/BOOK TITLE: The Astrophysical Journal
DATE OF PUBLICATION: 433, L25 (1994)
MOST NOTABLE ASPECTS: In this paper a new X-ray pulsar is identified and is noticed to have unusual characteristics with respect to those of the already known accreting X-ray pulsars in binary systems. This source has an extremely soft 1-10keV spectrum, a rather low pulsed fraction, and a small first period derivative. The results

presented in this letter have represented the starting point for the identification of the newly (at that time) class of X-ray pulsators, the Anomalous X-ray Pulsars (AXPs).