

**DETECTING CORRELATION BETWEEN THE ASTROMETRIC AND PHOTOMETRIC
VARIABILITY IN QUASARS**

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**1 - ON/MCT
2 - OV/UFRJ
3 - SYRTE/OP
4 - UEZO**

Quasars are the choicest objects to define a quasi-inertial reference frame. The largest long term apparent motion must be of the order of the micro-arc-second due to galactic aberration. At the same they are active galactic nucleus powered by a massive black hole. As the astrometric accuracy approaches the limit set by the forthcoming GAIA mission, the astrometric stability must be investigated. Though the optical emission from the core region usually exceeds the other components by a factor of hundred, the variability of those components must surely imply in some measure of variability on the astrometric baricenter. To investigate the correlation between long term optical variability and what is dubbed as the random walk of the astrometric center, a program is being pursued at the WFI/ESO2.2m. The sample was selected by the large amplitude and long term optical variability, as well as by reliable astrometric position. The observations are typically made every two months. The treatment is all differential, comparing the quasar position and brightness against a basket of selected stars for which the average relative distances and magnitudes remain constant. The first result was obtained for QSO-ICRF_J151250.5-090559, Mb=16.9, z=0.361, $\Delta M=1.5$, and $\Delta t=1.9y$. For six observations, in groups of two separated by 2 months, the astrometric variability was found at the level of 7mas and the photometric variability at the level of 0.4mag. The correlation of the variability is 0.99 along the X-axis and 0.91 along the Y-axis. Though no conclusion must be drawn from a single object, it brings strong support to the hypothesis made about the astrometric variability.

**OPTICAL MINUS VLBI POSITIONS OF ICRF SOURCES: THE
INFLUENCE OF SPATIALLY EXTENDED STRUCTURE**

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The celestial frame currently adopted by the IAU is the International Celestial Reference Frame (ICRF, Ma et al. 1998, AJ). The ICRF is a quasi-inertial frame based on the sub-milliarcsecond-accurate Very Long Baseline Interferometry (VLBI) positions of 212 extragalactic sources distributed all over the sky. In addition to these so called defining sources, some other 500 are also listed in the ICRF. They have positions that are consistent with the axes materialized by the defining frame. One underlying assumption when comparing optical and VLBI positions of these sources, defining or not, is the coincidence of their emission centres in space. At least to the less compact sources, this seems to hold no longer. In this work, thanks to observations of 16 ICRF sources with the ESO 2.2m telescope and of 11 ICRF sources with the SOAR telescope, we can report a significant progress as compared to our previous results on this subject. All source fields were imaged through overlapping frames and aiming at high signal-to-noise ratios (higher than 100) to the targets. As a consequence, we achieve an internal positional precision better than 10 milliarcseconds to $V \leq 18.5$ as well as profit from a reasonable number of reference stars to translate this internal precision into accuracy. Our first results indicate that, when comparing VLBI and optical positions of ICRF sources, the presence of extended structures larger than 10

milliarcseconds should be taken into account.

PAINEL 3

ESTUDO DO DIÂMETRO SOLAR OBSERVADO COM ASTROLÁBIOS EM FUNÇÃO DA LATITUDE HELIOGRÁFICA

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Medidas do diâmetro solar são feitas desde o começo do século XVIII. Variabilidades dessas medidas têm sido relatadas por diversos experimentos. Em especial, vários astrolábios já observaram durante um período maior que um ciclo solar. Medidas publicadas desses experimentos diferem em amplitude e quanto ao sinal da correlação com o ciclo solar. Ao mesmo tempo estes experimentos mostram correlação quando analisados em função da latitude heliográfica. Entretanto, valores publicados do achatamento solar, medido com astrolábios, variam de 13 a 148 mas (Noël 1999, A&A 343, 1001; Laclare et al. 1996, Sol. Phys 166, 211; Reis et al. 2003, Sol. Phys. 212, 7, Emilio & Leister 2005, MNRAS 361, 1005), enquanto outros métodos e medidas diretas do limbo solar feitas com o satélite SOHO mostram valores de 2 a 100 vezes menores (Emilio et al. 2007, APJL 660, L161). Este trabalho tem por objetivo entender por que medidas de diâmetro solar diferem quando comparadas em função do tempo e concordam quando analisadas em função da latitude heliográfica. Mostramos como cada astrolábio localizado em hemisférios opostos mede em diferentes latitudes heliográficas ao longo do ano. Analisamos as medidas em função da latitude heliográfica, separando-as por passagem (leste e oeste) e por distância zenital. Também agrupamos as medidas por época do ano e notamos variações sazonais. Concluimos que a correlação encontrada na análise do diâmetro em função da latitude heliográfica pode ser atribuída à variação sazonal nas medidas.

PAINEL 4

PRE-MAIN SEQUENCE STARS: A KINEMATIC CENSUS

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The kinematic studies of pre-main sequence (PMS) stars are fundamental in order to discuss their formation mechanism and their membership properties. This work is the initial part of a more complete project which aims to determine distances of PMS stars. Many of the PMS stars were not observed by the Hipparcos satellite due to their magnitude nor have any measured distance, essential to the physical characterization of an object. In our project we will determine the distance for the stars members of moving groups using the convergent point strategy. At this first stage of the work we are dealing with a sample of 1250 PMS stars and 104 candidates spread over major star-forming regions of an all sky catalog of proper motions. An exhaustive search in the CDS databases for PMS stars with known proper motions and radial velocity has been conducted in order to develop our strategy. Proper motions allow the detection of structures as moving groups and associations to which these stars belong. The members of a moving group, which share the same space motion, allow us to obtain the convergent point from which, considering that the radial velocity is known, we can determine the kinematic distance. We present the result of this census by stellar formation region and the discussion of some moving group candidates.