ABSTRACTS

1993AAS...182.7202O

"in the 1st month, sun is in Yingshi." Invented in ca. 2000 BC and improved in 240-104 BC it was lunisolar and Metonic–7 leap moons in 19 yr. The more exact solstice and midnight were used later. Liu Xiang's (77-9 BC) Hong Fan Zhuang, eg, says "the original Zhuaxu calendar began on cyclic day 6, month 31, yr 31 (modulo 60) at the start of spring when the sun, moon and 5 planets met in Yingshi, S°. Liu's interpolated date is wrong, and its errors can be reproduced mathematically. Some even consider it an imaginary epoch when the day, lunation, year and planetary cycles began together. The strive for ideally synchronized calendars drove Chinese astronomy ever forward. With ever more exact data Superior Epoch, the lowest common product of the periods [set rational] and 60, got ever larger, eg, > 2.76x10^10 yr ago! Guo Shoujing, Kubilai's Astronomer Royal, finally realizing the periods are not commensurable, ended the quest in 1280. Jesuits in China, computing anew via Keplerian formulas, also errored. Their date, 2/28/2449 BC, is still listed as a "Guinness world record" [MNRAS 24, 186, 1863-4; Patrick Moore, 1983]. Using new lunar/planetary ephemerides, h_0000 and dT values [Eos 73 #43, 62, 1992] we have uniquely matched Liu's record with sky conditions computed for early 1953 BC. On 2/26 the 5 planets, visible before dawn, spanned <5°. On 3/5 the sun, new moon and 5 planets were still in Yingshi, aka Quadrangle Ding=lunar mansions 1+14, old width 37° in RA, E of • Peg yer: 165-BC Han tomb cosmic board; Chinese Encyl Astron, 282, 1980). 3/51953 BC was cyclic day 24 (and Monday!). The ancient Chinese chose 1st mon, new moon chuji, and day 24 dinghui as most auspicious (cf. Friday the 13th)-far more often than all others combined--suggesting that they remembered the unique event though not the yr. Finally we suggest that the I Ching (Book of Changes) and Bamboo Annals passage "the River Lo gave forth the tortoise book Hong Fan (magic square) to Yu", the hydrologist who founded the Xia dynasty, is a metaphor for the 1953 BC predawn rise of the superconstellation Black Tortoise-Pegasus Square and 5 planets over the SE horizon, as seen from the NW shores of River Lo (S Xia; 35°N, 110°E).

71.08
Oversampling digital interferometry for reaching LIGO sensitivity
L. N. Mertz

Oversampling with ordered electronic dither can be used in conjunction with three-phase digital interferometry to improve the resolution-bandwidth tradeoff to a square relation as contrasted with the square root relation that prevails for shot noise. Fast primary sampling followed by 2nd order lowpass digital filtering can thereby reduce the phase quantization error down to leave only shot noise for any reasonable laser power. The technology does work, although it is not widely known even among experts. A long list of advantages as compared with active servo measurement for the LIGO (Laser Interferometer Gravitational-wave Observatory) project will be enumerated.

Session 72: HAD
Oral Session, 10:30 am–12:00 pm
Wheeler

72.01
The "Holy Grail" of Chinese Astronomy: The Sun-Moon-Five-Planet Conjunction in Yingshi (Pegasus) on March 5, 1953 BC
K. D. Pang (JPL), J. A. Banger (USNO)
Sirius' heliacal rise (with Nile floods) in the summer "dog days" regulated the Egyptian Sothic calendar. Yingshi's heliacal rise initiated spring in the Zhuaxu calendar, eg, The Book of Rites says...