there are 16 pages of colour plates, half of which are near the beginning and half near the end of the book. I probably would have chosen similar illustrations, but not devoted a quarter of the plates' pages to simulated images of the future merger of the Milky Way and Andromeda galaxies. The only other figures are line drawings at the beginning of each chapter, illustrating the corresponding main topic. There are neither footnotes nor endnotes. The main text is followed by a seven-page glossary then, in small print, picture credits and an eight-page index. The book comes with a dust jacket, but beneath that the binding is covered by a CMB map from *Planck* and its mirror image, joined at the spine.

On the whole, this book is a good broad overview of the history of the Universe, but one sufficiently different that most readers will probably run across something which they haven't read before. Despite the qualms mentioned above it could be a good first book on the topic. (I mentioned more qualms than usual as I'm sure that the author will appreciate the curmudgeonly attention to detail and the exacting standards of this *Magazine*[12].) — PHILLIP HELBIG.

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THESIS ABSTRACT

PLANETESIMAL BELTS IN MISALIGNED WIDE STELLAR BINARIES

By Steven Young

Some main-sequence and post-main-sequence stars show signatures of close-in hot dust which cannot have formed there or been produced *in situ* as the collisional time-scales at these locations are much smaller than the ages of the systems. Hence, there must exist some dynamical mechanism to deliver rocky bodies to small distances on time-scales of 10–10^4 Myrs. This thesis examines the feasibility and detectability of one of these potential mechanisms: the eccentric Kozai–Lidov effect (Eccentric Kozai Mechanism, EKM) whereby a stellar companion on a misaligned wide orbit perturbs planetesimals to high eccentricities. First, in order to explain the mysterious light-curve of KIC 8462852, one component of a wide binary-star system in the *Kepler* field with deep, irregular, and aperiodic dips in its

light-curve, a Monte Carlo model of planetesimal belts in wide stellar binaries was created. It found that the occurrence rate of KIC 8462852-like observations in the *Kepler* field is 10^{-8} and hence that the probability of the *Kepler* telescope observing such phenomena to be 10^{-3}. It also found that the systems most likely to be observed have planetesimal belts at 10^2–10^3 AU, stellar companions at 10^2–10^4 AU, stellar masses of $\geq 1 M_\odot$ and ages of 10^2–10^3 Myrs. Therefore, despite being in the right age range and with a companion at the right distance, it is unlikely that the EKM caused by the companion star is the cause of these observations.

This thesis then followed the surface-density evolution of three narrow debris discs, as well as one wide disc, with a stellar companion at $a_{\rm comp} = 878$ AU and an inclination of 88°. It found that the EKM imprinted a petal-shaped structure on the narrow discs due to the disc particles librating between a fixed set of values for the longitude of pericentre which depend only on the initial inclination. As the evolution of the wide disc is the superposition of the evolution of the three narrow discs, these petal structures combined to produce an X-shaped structure. 'Thermal emission' images were then produced for the wide disc to see if the X-shaped structure would be observable. It was found that, as the tips of the structure corresponding to the apocentres of eccentric orbits were more dense, they dominate the thermal emission and the structure appears as four 'clumps'. The time evolution of the fractional luminosity and flux at 5 and 12 μm for these discs was then calculated. The fractional luminosity did not vary by more than an order of magnitude as it was dominated by distant cold dust and hence this mechanism cannot explain the high values of fractional luminosity associated with extreme debris discs. Likewise, whilst the infrared flux at 5 and 12 μm does increase by orders of magnitude to $\approx 10^{-4}$, it is not high enough to explain the brightest exozodi like η Corvi or β Leo, though it could explain fainter exozodi. — *University of Cambridge*; *accepted 2024 June*.

Here and There

THE OLDEST CITIES?

. . . mega-flood from the North Sea when the land bridge from Dover in England to Calais in France collapsed. —Paul Murdin, *The Universe: A Biography* (Thames & Hudson), p. 230.