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From electrons to stars : modelling and mitigation of radiation damage effects on astronomical CCDs

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STELLINGEN — PROPOSITIONS

associated with the thesis

From Electrons to Stars

Modelling and mitigation of radiation
damage effects on astronomical CCDs

1. CCD radiation damage induces an irreversible loss of accuracy in the image location measurement of at most 6 per cent in the Gaia operating conditions.
Chapter 3
2. The use of hardware solutions to counter radiation induced charge transfer inefficiency is necessary but not sufficient to recover the required astrometric accuracy of Gaia.
Chapters 3 and 4
3. It is possible to determine the true image location from an observation affected by charge transfer inefficiency without applying any direct correction of the raw data.
Chapters 3 and 5
4. The Gaia charge transfer inefficiency mitigation strategy must take into account the possible lack of a functional supplementary buried channel in a Gaia CCD.
Chapter 6
5. CCD manufacturers should pursue the development of supplementary buried channels despite the added complexity and risk in the CCD fabrication process.
Chapter 6
6. Radiation damage is no longer a threat to the science performance of Gaia, its effects can be calibrated out.
Chapters 3, 4, 5, 6
7. Art and science are the two driving forces of mankind's progress; budget cuts in these fields are a direct threat to our civilization.
8. In this time of environmental, economical, and financial crises, the more the immigration topic is present in a political speech the less attention the speaker deserves.
9. Societies driven by the economic growth dogma are living a short-term utopia.
10. Dictators who armed their people should always be judged together with the nations that provided the weapons used.

Thibaut Prod'homme
Leiden, 25 October 2011