Developments in Dynamic Modelling

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ADAS 2007 – Ringberg Schloss
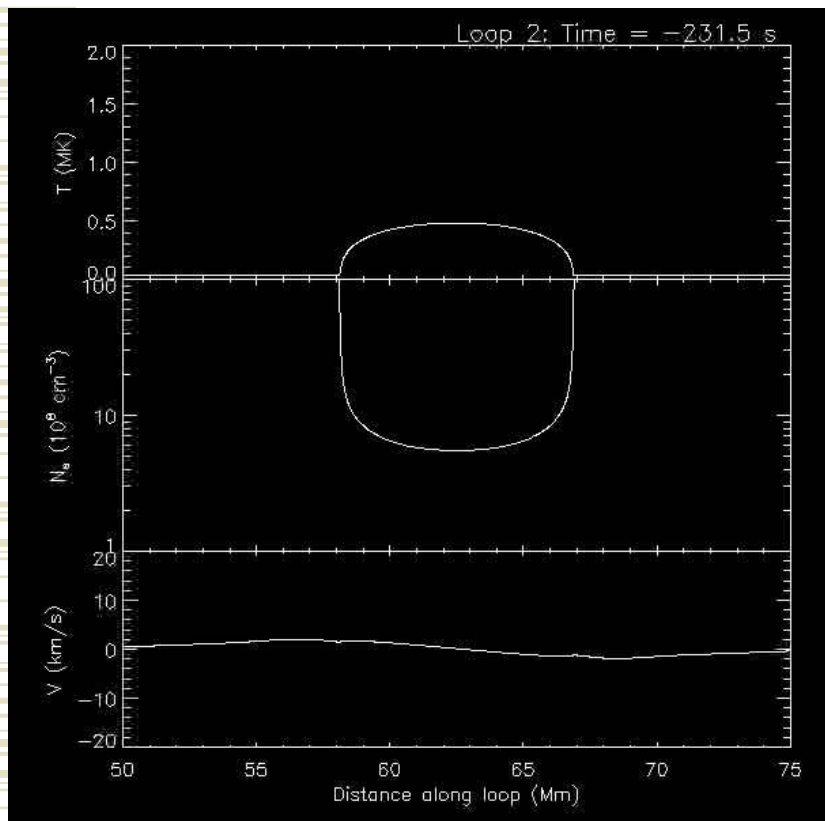
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motivationS

➢Understanding the structure and dynamics of the Sun's TR and inner corona

  ➢Recent observations revealed a wealth of dynamic fine-scale structures. Partial explanation of why static models on hot large-scale loops could not match observations

  ➢Reproducing the observed emission measure ($\propto \int N_e^2 dV$) and persistent red-shift ($F(T)$).

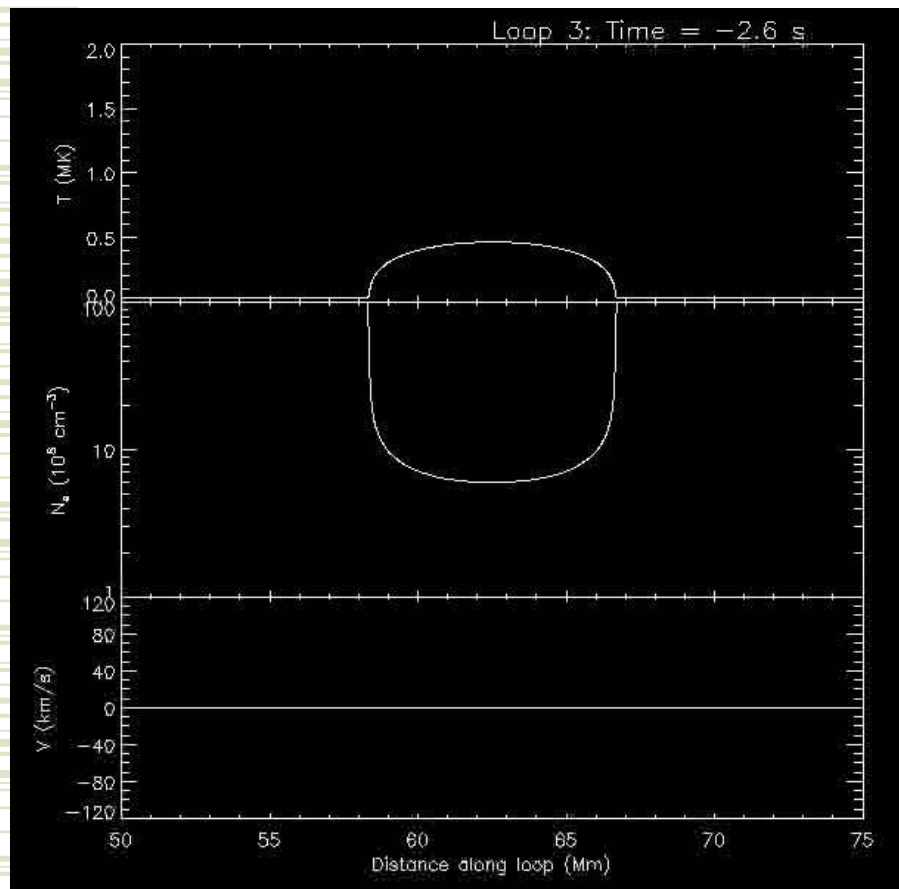 ➢Presence of small network cool loops constituents of TR (SOHO/SUMER)

  ➢Nanoflares heating

Impulsive heating

- ARGOS (PARAMESH) runs
- Loop #2
- L = 5e8 cm + 2*6e7 cm (chromo)
- H = 0.8 e8 cm
- E_0 = 3e-4 [ergs cm^{-3} s^{-1}]
- q = 1e-2 [ergs cm-3 s-1]
- t = 200 s
- Asymmetric heating

- Spadaro et al (2003, 2006)

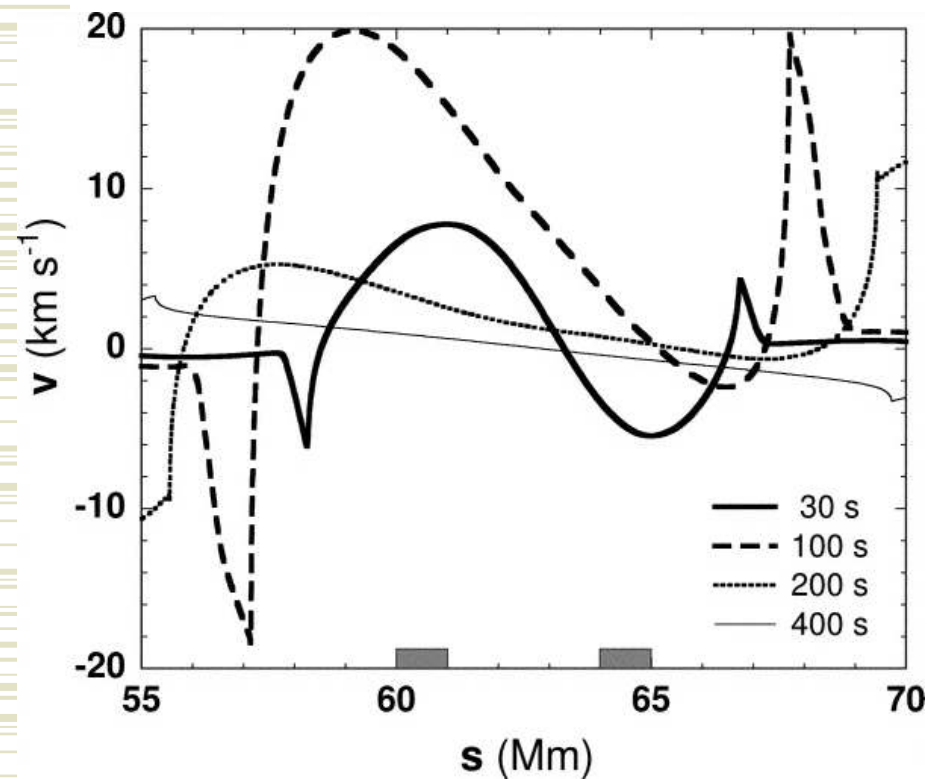# Impulsive heating

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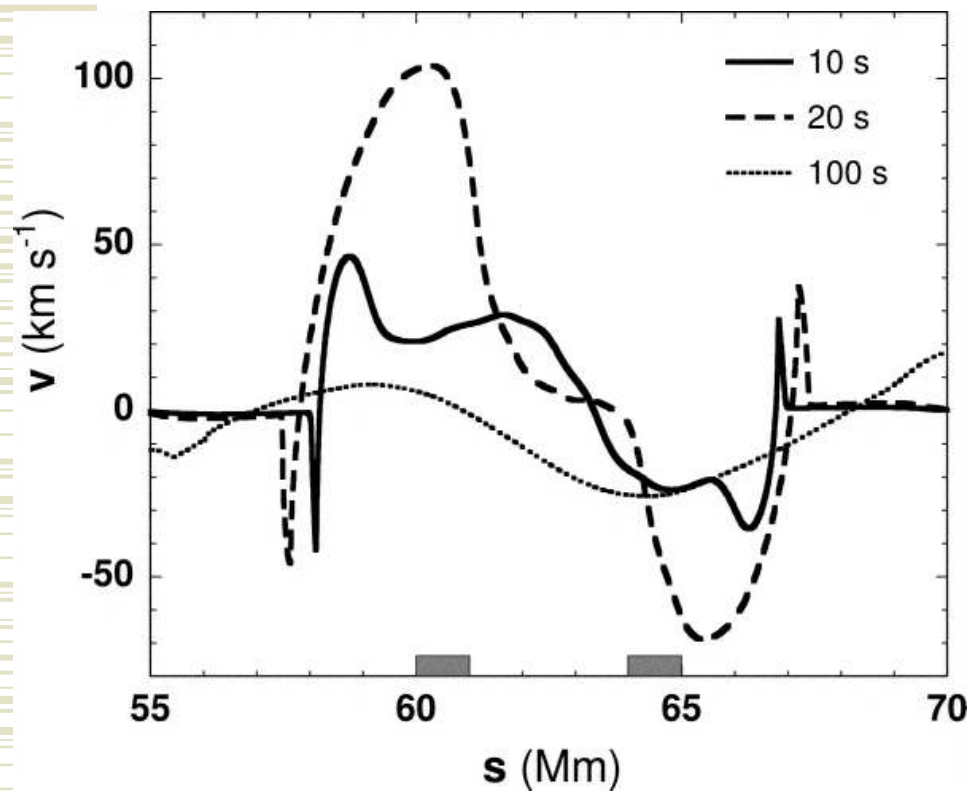# Impulsive heating

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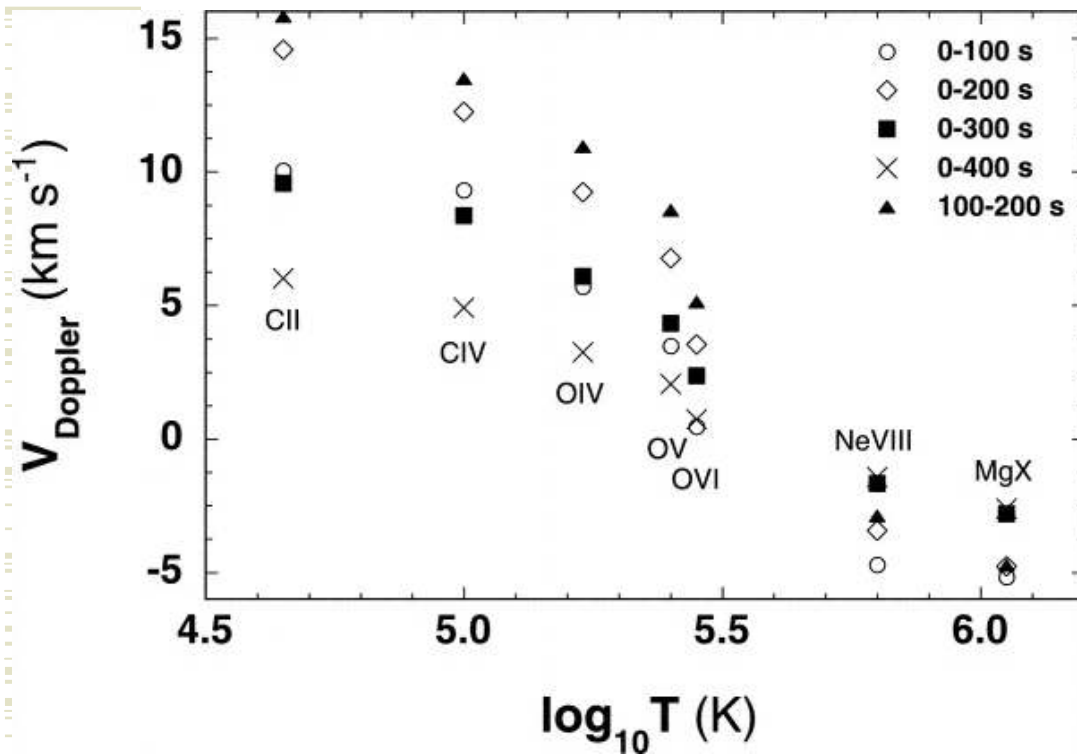# Impulsive heating

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Impulsive heating: lambda-shift

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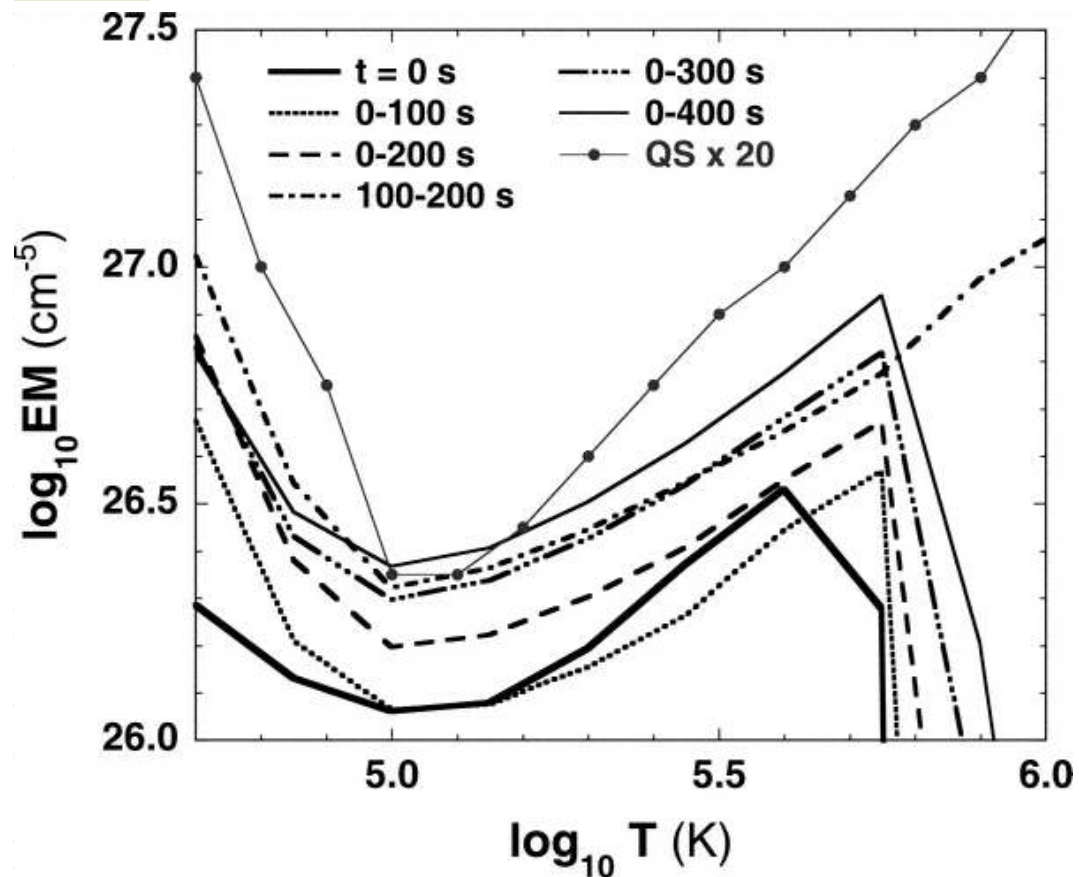# Impulsive heating: persistent lambda-shift

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Impulsive heating:emission measure

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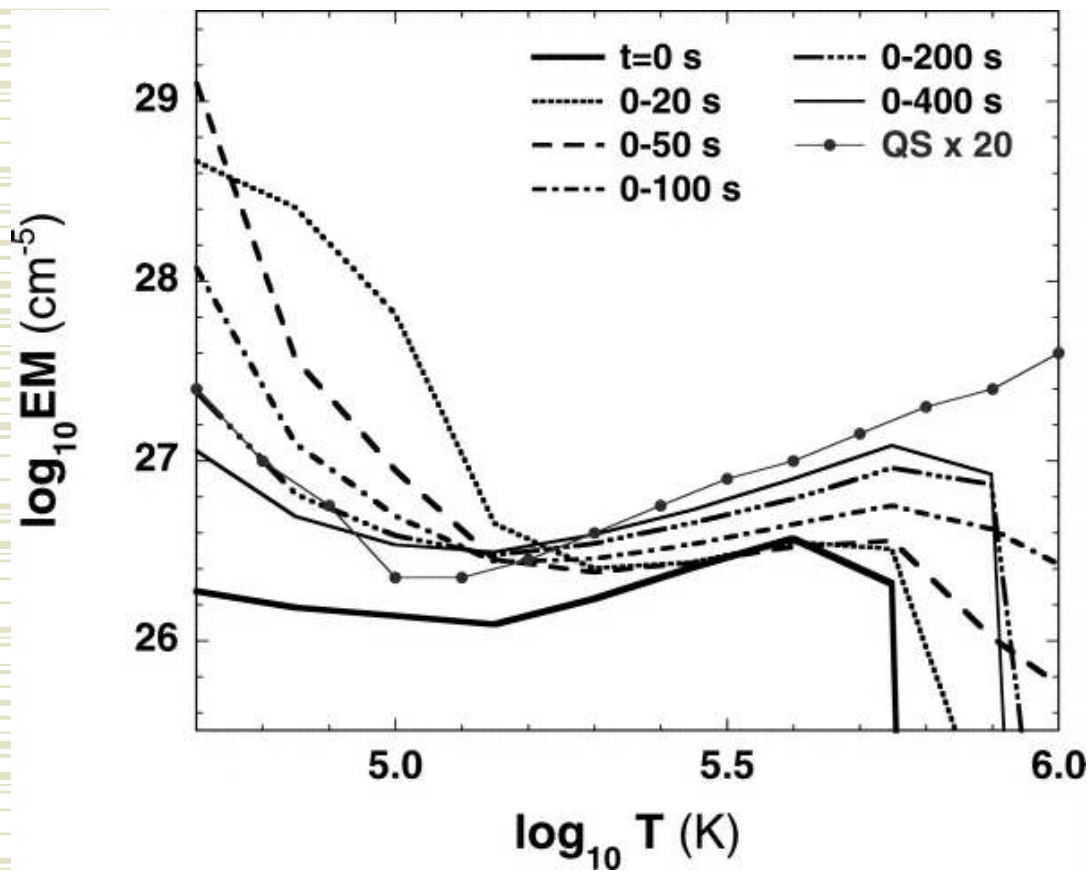- t = 200 s
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Impulsive heating: emission measure

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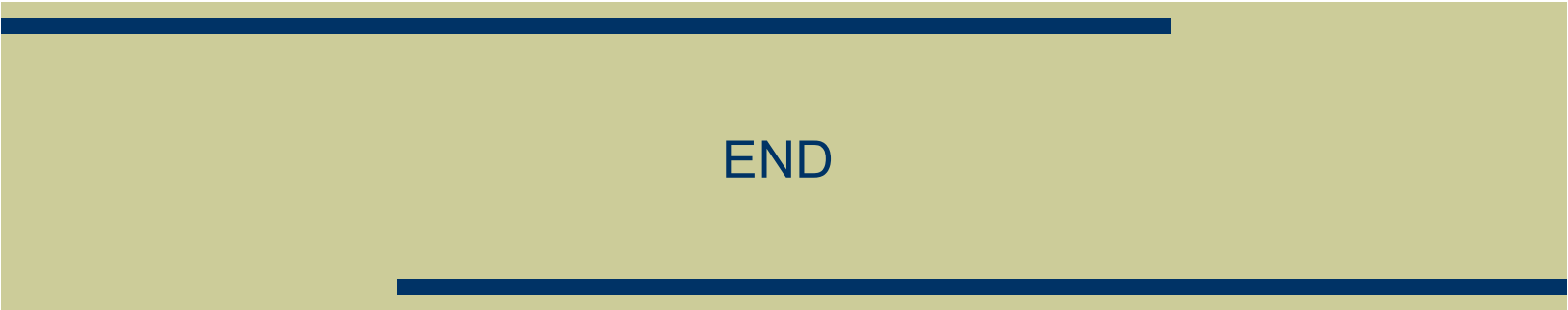
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Aims of the project

- Dynamic modelling of major diagnostics: ions of C, O, Ne, Mg, Si, Fe

  - Computation of electron impact x-secs

  - Production of GCR coefficients

  - Update statistical balance code (population densities in dynamical plasma)

  - Application to HD simulations already done plus new (bundles of loops, different regimes, etc.):

Status of the project

- Started april 2005 (glasgow work-in)

- Collaborators/Consultants: H. Summers, A. Whiteford, M. O'Mullane, M. Witthoeft, C. Ballance, N. Badnell, D.Spadaro, N. Lanza

- COMETA/TriGrid grant 2007-2008 (post-graduate research contract – Francesco Marziani)

  - R-max calculation on Sicilian (Trinacria) GRID

- PhD at Strathclyde University /RAL / JET (Alessandra Giunta start January 2007)

- GCR coefficients available for C, O, Ne (need update?)

- Currently concentrating on Mg ions

- Some work still needed on coding for GCR coefficients?

- Future developments: Fe, Si, update O, C, Ne?

END