

SWG 2010 Spring, Dublin, Ireland

IMPACT SWEA
electron measurements
and the temporal evolution
of the solar wind

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for the SWEA team

SWEA core density proxy

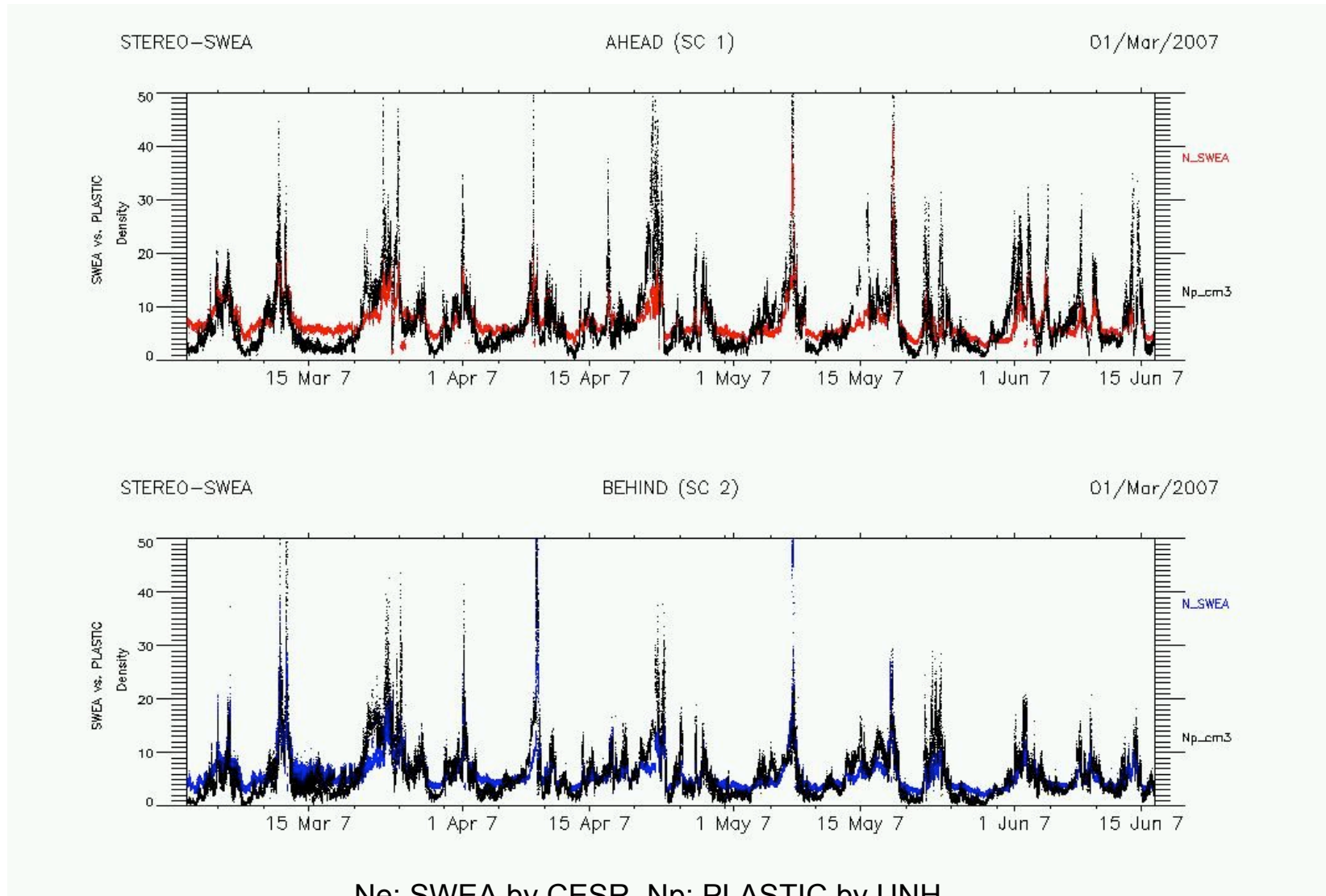
SWEA status reported by J-A. Sauvaud and J. Luhmann

- High energy excellent measurements: PADs, Q, etc.
 - ☞ SWEA data available at <http://stereo.cesr.fr>
- Low energy solar wind electrons suppressed < 45 eV
 - ☞ No core distribution

SW electron core reconstruction from secondary electrons

- Secondaries produced in instrument are unveiled
 - Secondaries depend on density of SW electrons arriving on SWEA
 - ☞ Derive SW electron density proxy from secondary electrons
- Fedorov, Opitz, Sauvaud et al. 2010 submitted at SSR*

SWEA core density proxy

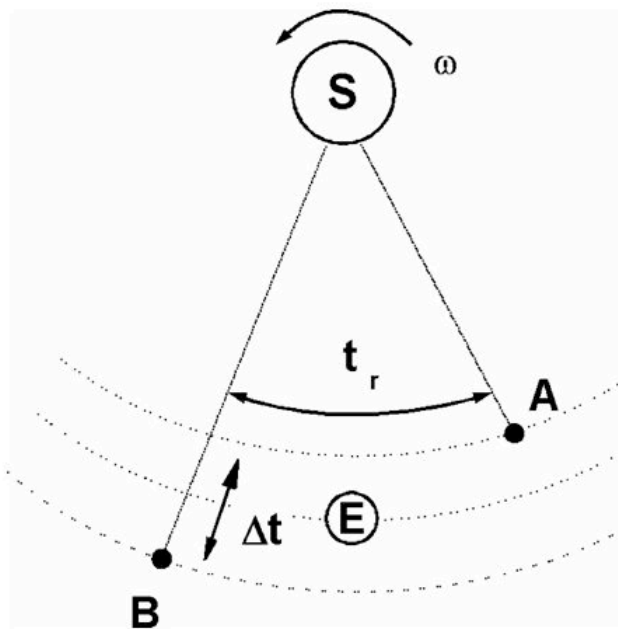


Ne: SWEA by CESR, Np: PLASTIC by UNH

STEREO timelag

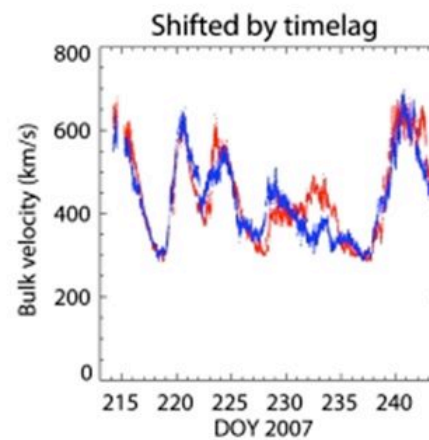
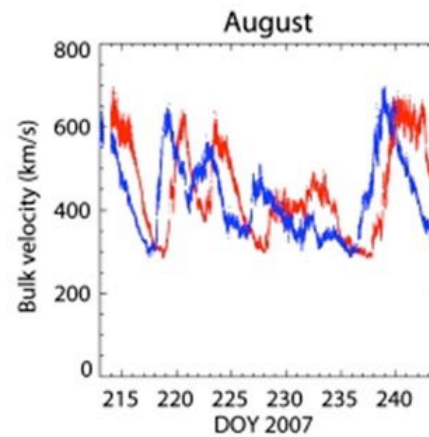
STA

STB

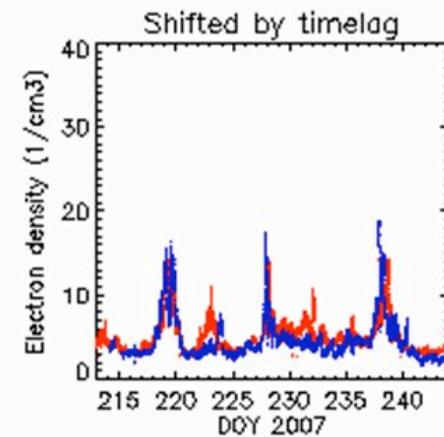
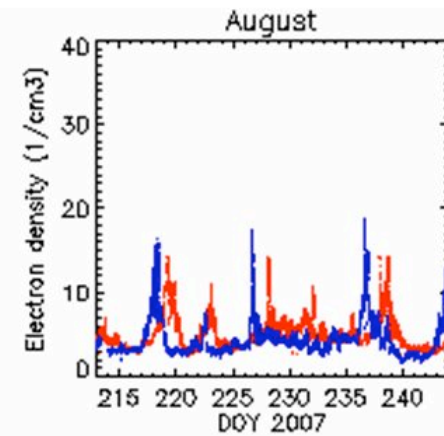


Opitz et al. 2009, SolPhys

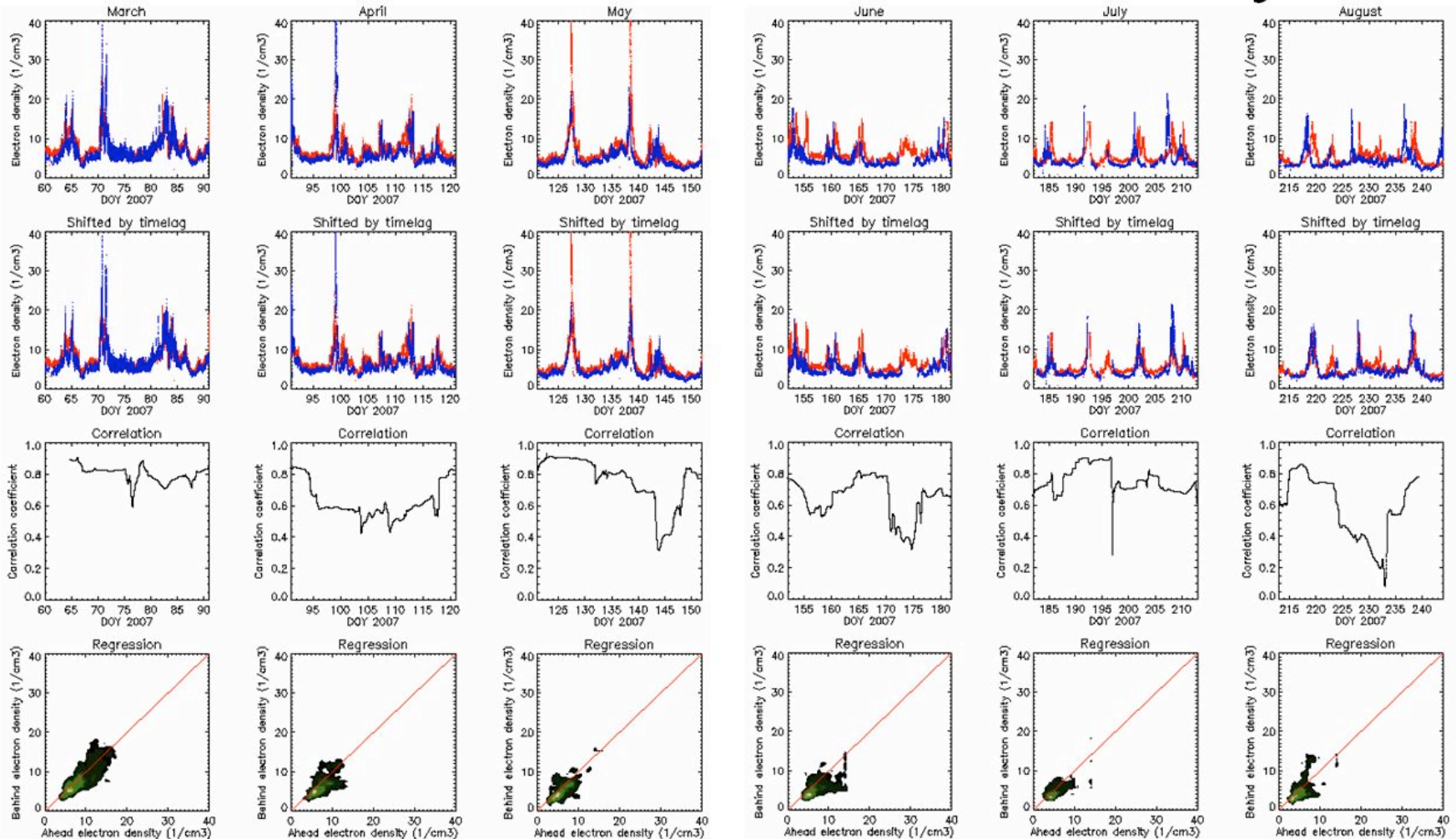
PLASTIC velocity



SWEA density



SWEA electron core density



Opitz et al. 2010a, submitted at Solar Physics

Temporal evolution of the solar wind

Opitz et al. 2009a, Solar Physics

PLASTIC velocity \Rightarrow

0.5 day: ~ 0.95

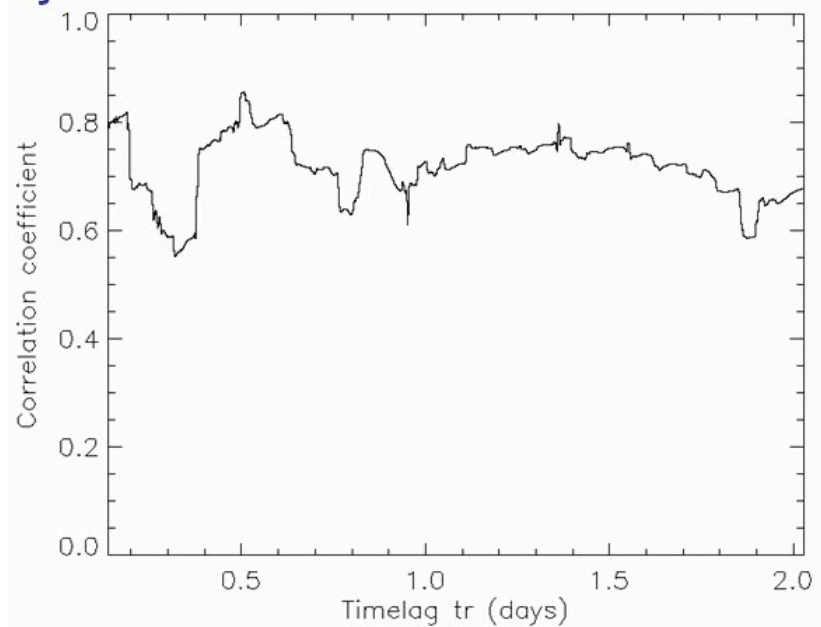
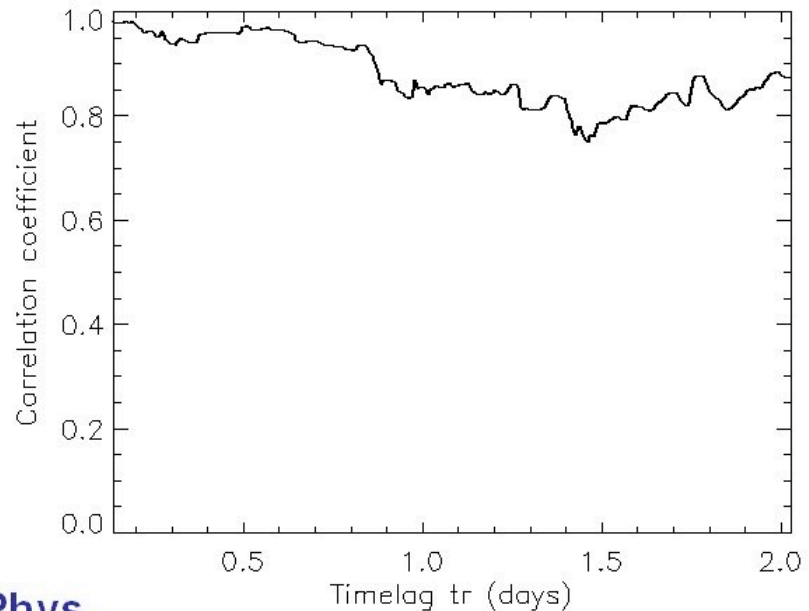
2 days: ~ 0.85

Opitz et al. 2010a, submitted at Sol. Phys.

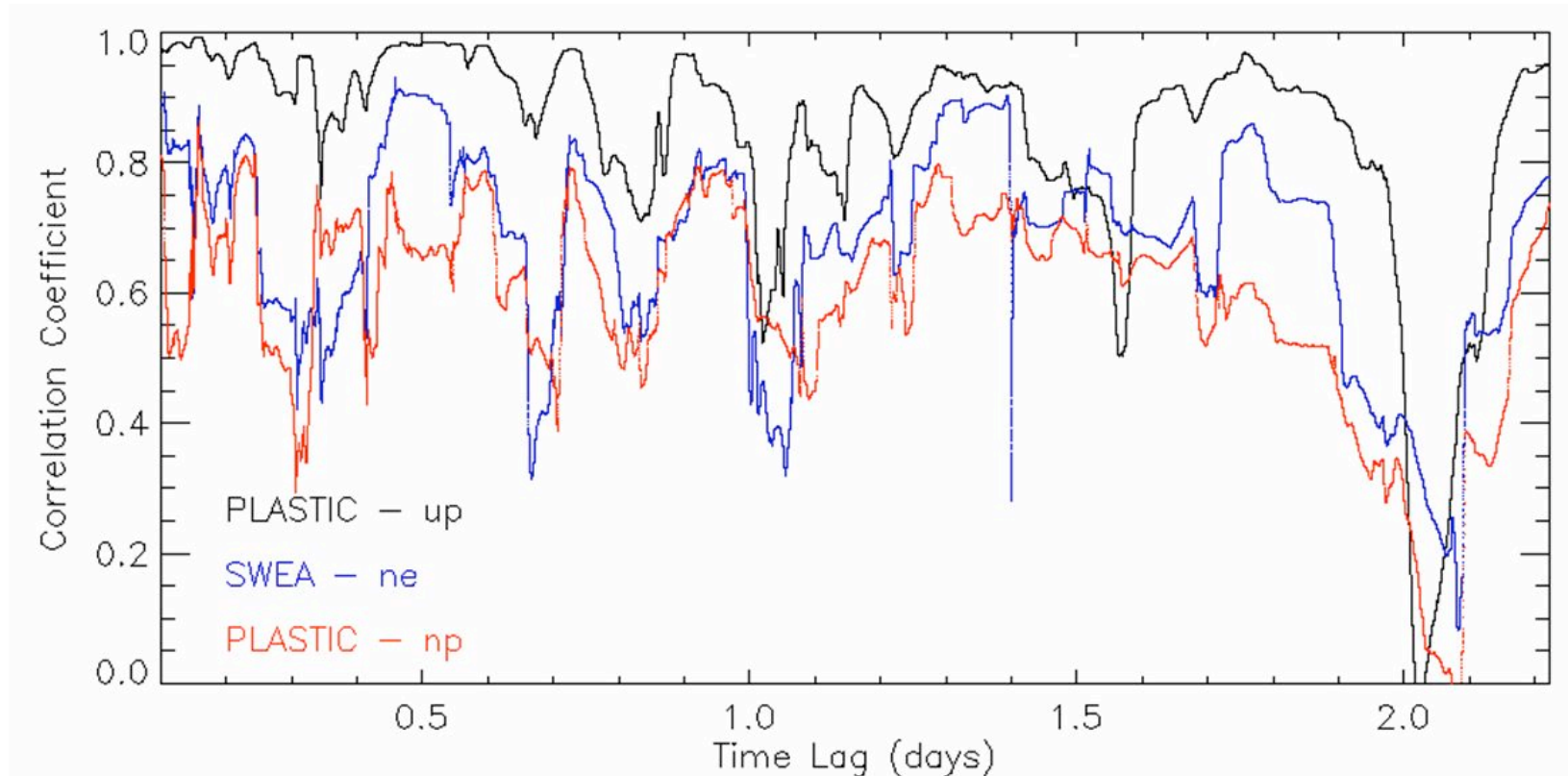
SWEA density \Rightarrow

0.5 day: ~ 0.80

2 days: ~ 0.65



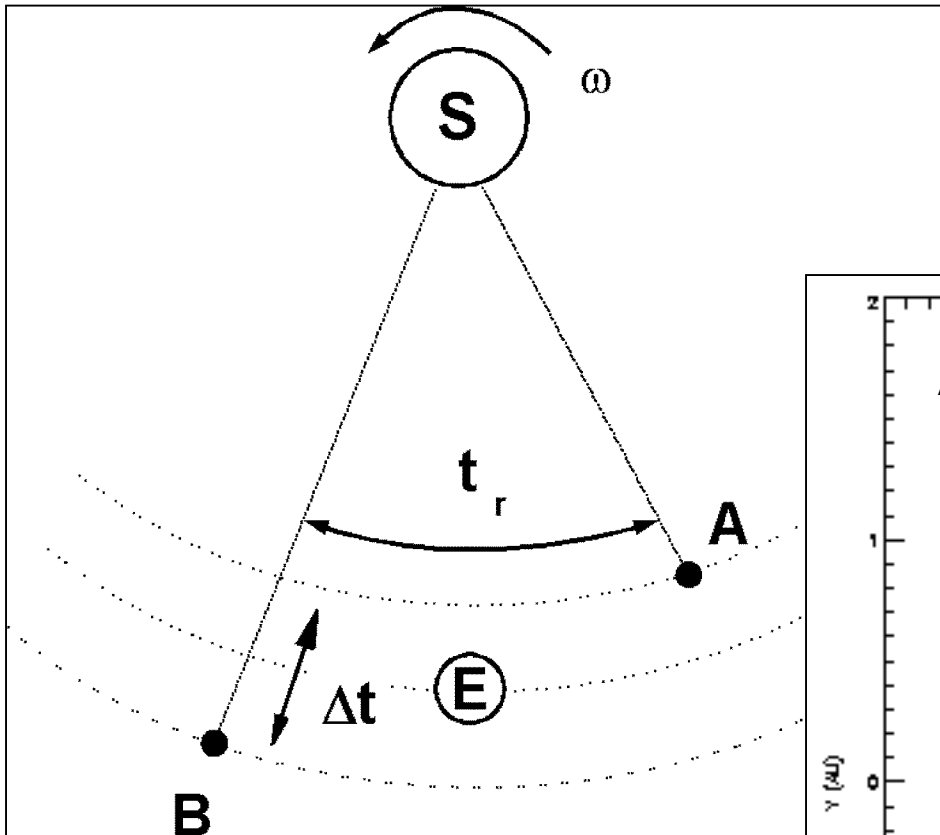
SW temporal evolution



Up: PLASTIC by UoBe, Ne: SWEA by CESR, Np: PLASTIC by UNH

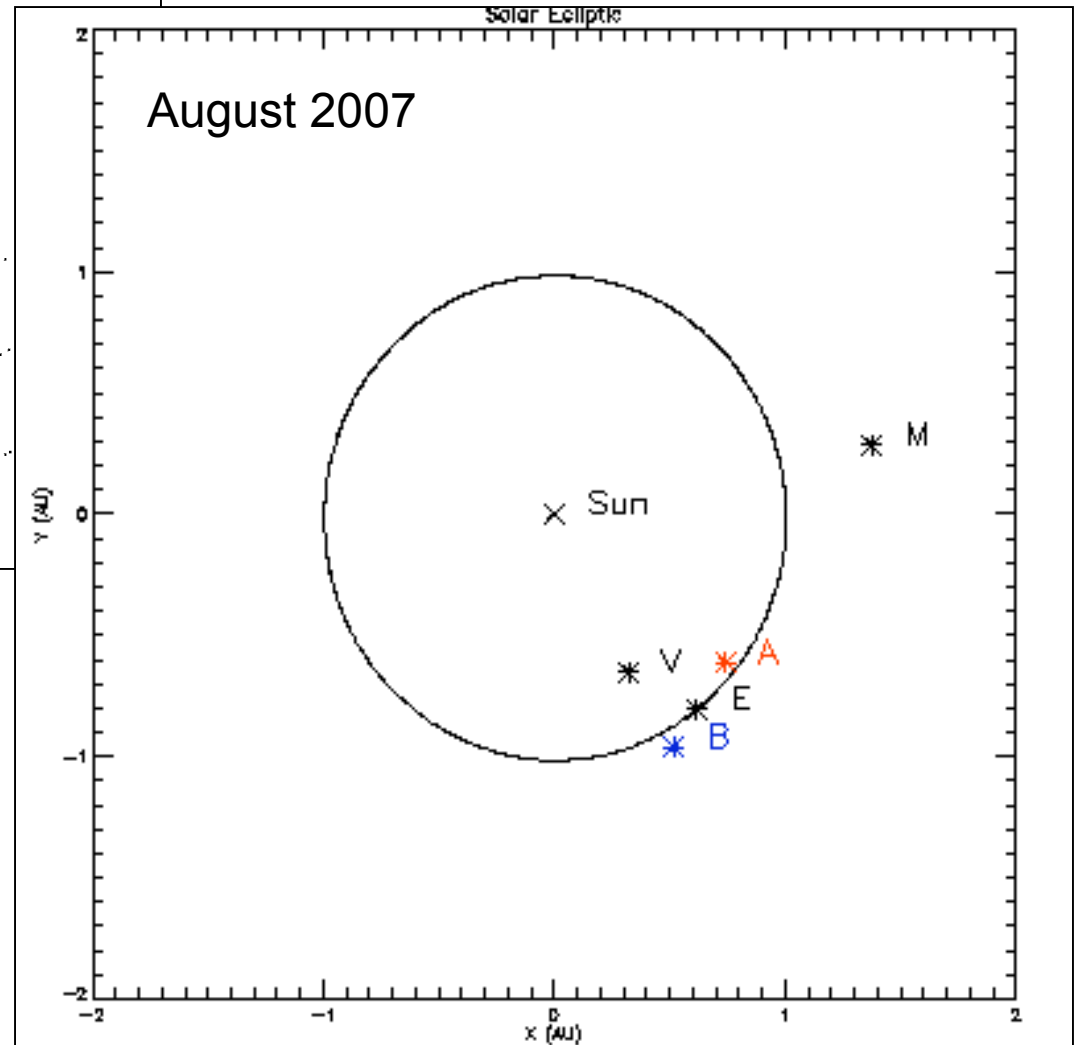
from results by Opitz et al. 2009 SolPhys and Opitz et al. 2010a, submitted at SolPhys

SW prediction for heliosphere



Opitz et al. 2009, SolPhys

Opitz et al. 2010b,
submitted at SolPhys



References

- **Sauvaud J-A., et al.** *The IMPACT Solar Wind Electron Analyzer (SWEA)* Space Sci. Rev., vol. 136, p227, **2008**
- **Fedorov A., Opitz A., Sauvaud J-A., Luhmann J. G., Curtis D. W., and Larson D. E.** *SWEA in-flight properties. Reconstruction of the SWEA transmission function by numerical simulation and data analysis* Space Science Review, submitted, **2010**
- **Opitz A., Karrer R., Wurz P., Galvin A. B., Bochsler P., et al.** *Temporal evolution of the solar wind bulk velocity at solar minimum by correlating the STEREO A and B PLASTIC measurements* Solar Physics, vol. 256, p365 , **2009**
- **Opitz A., Sauvaud J-A., Fedorov A., Wurz P., Luhmann J. G., Lavraud B., Russell C. T., Kellogg P., Briand C., Henri P., Malaspina D. M., Louarn P., Curtis D. W., Penou E., Karrer R., Galvin A. B., Larson D. E., Dandouras I., and Schroeder P.** *Temporal evolution of the solar wind electron core density at solar minimum by correlating the STEREO A and B SWEA measurements* Solar Physics, submitted, **2010a**
- **Opitz A., Fedorov A., Wurz P., Szego K., Sauvaud J-A., Karrer R., Galvin A. B., Barabash S., and Ipavich F.** *Solar wind bulk velocity throughout the inner heliosphere from multi-spacercraft measurements* Solar Physics, submitted, **2010b**