

GCOE 国際会議出席報告書 (外国旅費用)

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発表題名	The role of torsional Alfvén waves in coronal heating		
著者名	Antolin Patrick		
会議名称 ・開催期間	The Dynamic Solar Corona – CAS-IAU Joint Solar Eclipse Meeting 自 2009年07月23日 ~ 至 2009年07月26日		
開催地 (国、市)	China・ Suzhou – Suzhou International Conference Center		
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国別参加者数	140人		
<p>発表内容、聴衆の反応、質疑応答、その他について簡潔に記述してください。 (口頭発表・ポスター発表の別も文中に明記すること。)</p> <p>The oral presentation made in the CAS-IAU Joint solar eclipse meeting concerned the subject of coronal heating, one of the most important unsolved problems in astrophysics. Alfvén waves, a candidate for explaining the heating of the solar corona, were first predicted by Alfvén in 1947. Yet, only in the last few years substantial proof of their existence in the Sun have been brought. A strong debate exists on whether these waves are important for heating the solar corona.</p> <p>The presented research has as aim to assess how important Alfvén waves are in coronal heating. We concentrate on investigating the heating of coronal loops, the building blocks of the solar corona. A parameter survey is carried out in which various parameters of a coronal loop are varied, and the influence on the Alfvén wave heating is studied. It is found that Alfvén waves can efficiently heat only long and thick coronal loops, which are mostly likely to be found in Quiet Sun regions, rather than Active regions. The general conclusion is thus that Alfvén wave heating may not be able to explain the heating of the corona in active regions, but may be important for coronae in the Quiet Sun.</p> <p>The talk was received with general agreement, and gave rise to many interesting questions. Professor Banerjee asked the important question of whether the presented study is applicable for open magnetic field regions. In that case, wave-to-wave interaction is reduced but still present. Doctor Takeru Suzuki has</p>			

conducted several studies for that case in which it is shown that Alfvén wave heating is important, which matches the prediction from our study.

Professor Chen asked whether the predicted resonance for the case of 600 s Alfvén waves generation can be observed in the corona. The power issuing from these waves is large enough to be observed, since it is far stronger than the power from the standing ambient sound modes.

Professor Koutchmy asked whether short period Alfvén waves are important in coronal heating. Our results indicate that they are not important for creating hot loops, but are however important for creating stable coronae.

Professor Erdélyi asked whether the viscosity parameter was also included in the parameter survey. The later was not included, so he suggested trying different values for the viscosity parameter since it is important for shock heating. Related to this question, Van Doorselaere suggested changing the viscosity parameter in the momentum equation for a resistive parameter. This change may affect considerably the location of the heating, since resistivity is higher towards the footpoints of loops. This will be taken into account in an extension of our present study.

The obtained resonance in the loop is also a matter of further research which may lead to further important results.