		doc_1		doc_2	decision	id
cases	**authors**	• Xumin Gu	**authors**	• Xumin Gu	NOT DUPLICATES	1237
	title	Well-posedness of axially symmetric incompressible ideal magnetohydrodynamic equations with vacuum under the Rayleigh-Taylor sign condition	**title**	Well-posedness of axially symmetric incompressible ideal magnetohydrodynamic equations with vacuum under the non-collinearity condition		
	publication_date	2017-12-06 00:00:00	**publication_date**	2017-11-23 00:00:00		
	source	SupportedSources.SEMANTIC_SCHOLAR	**source**	SupportedSources.SEMANTIC_SCHOLAR		
	journal	arXiv: Analysis of PDEs	**journal**			
	volume		**volume**			
	doi		**doi**	10.3934/CPAA.2019029		
	urls	• https://www.semanticscholar.org/paper/815ae9c974d22a42095c4553da1d40868dd13f06	**urls**	• https://www.semanticscholar.org/paper/c2460ccd67f1f82e9f44ce419d41de29bef314b6		
	id	id87086665001411119	**id**	id-475301048772190966		
	abstract	We consider a free boundary problem for the axially symmetric incompressible ideal magnetohydrodynamic equations that describes the motion of the plasma in vacuum. Both the plasma magnetic field and vacuum magnetic field are tangent along the plasma-vacuum interface. Moreover, the vacuum magnetic field is composed in a non-simply connected domain and hence is non-trivial. Under the Rayleigh-Taylor sign condition on the free surface, we prove the local well-posedness of the problem in Sobolev spaces. Furthermore, we also prove the local well-posedness under a more general "stability" assumption for the initial data, which provided that the Rayleigh-Taylor sign condition is satisfied at all those points of the initial interface where the non-collinearity condition fails.	**abstract**	We consider a free boundary problem for the axially symmetric incompressible ideal magnetohydrodynamic equations that describes the motion of the plasma in vacuum. Both the plasma magnetic field and vacuum magnetic field are tangent along the plasma-vacuum interface. Moreover, the vacuum magnetic field is composed in a non-simply connected domain and hence is non-trivial. Under the non-collinearity condition on the free surface, we prove the local well-posedness of the problem in Sobolev spaces.		
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