

# Scientific usage of the PENCIL CODE

Search results using <http://adslabs.org> and  
Bumblebee <https://ui.adsabs.harvard.edu/>

<http://pencil-code.nordita.org/highlights/>

April 1, 2023

A search using ADS <https://ui.adsabs.harvard.edu/> lists the papers in which the PENCIL CODE is being quoted. In the following we present the papers that are making use of the code either for their own scientific work of those authors, or for code comparison purposes. We include conference proceedings, which make up 15–20% of all papers. We classify the references by year and by topic, although the topics are often overlapping. The primary application of the PENCIL CODE lies in astrophysics, in which case we classify the papers mostly by the field of research. Additional applications can also be found in meteorology and combustion.

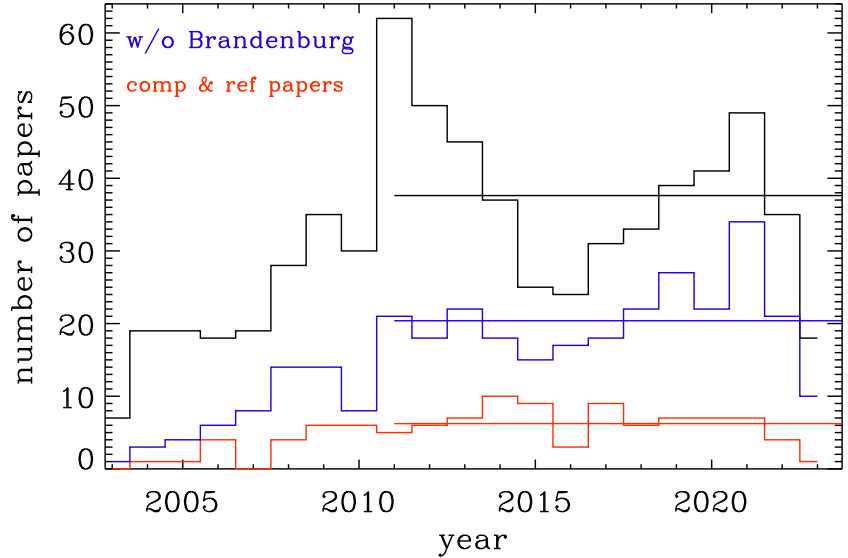


Figure 1: Number of papers since 2003 that make use of the PENCIL CODE. In red is shown the number of papers that reference it for code comparison or other purposes and in blue the papers that are not co-authored by Brandenburg. The enhanced number of papers during 2011–2013 results from publications related to his ERC Advanced Grant.

## 1 Papers by year

As of July 2022, the PENCIL CODE has been used for a total of 664 research papers; see Figure 1; 323 of those are papers (49%) are not co-authored by Brandenburg. In addition, 103 papers reference it for code comparison or other purposes (see the red line).

18 times in 2023 (Hidalgo *et al.*, 2023; Mizerski *et al.*, 2023; Yuvraj *et al.*, 2023; Zhou and Blackman, 2023; He *et al.*, 2022; Tharakkal *et al.*, 2022; Brandenburg *et al.*, 2023a,b,c;

Brandenburg, 2023b,a; Mtchedlidze *et al.*, 2023; Park *et al.*, 2023; Zhang *et al.*, 2023; Sengupta and Umurhan, 2023; Gent *et al.*, 2023; Meftah, 2023; Käpylä, 2023),

35 times in 2022 (Becerra *et al.*, 2022a; Tschernitz and Bourdin, 2022; Li *et al.*, 2022; Carenza *et al.*, 2022; Käpylä and Singh, 2022; Ortiz-Rodríguez *et al.*, 2022; Hyder *et al.*, 2022; Zhou *et al.*, 2022; Masada and Sano, 2022; Lipatnikov and Sabelnikov, 2022; Käpylä *et al.*, 2022; Yang and Zhu, 2022; Roper Pol, 2022; Sharma and Brandenburg, 2022; Brandenburg and Ntormousi, 2022; Navarrete *et al.*, 2022; AlbertoRoper, 2022; Baehr *et al.*, 2022; Stejko *et al.*, 2022; Currie *et al.*, 2022a; Roper Pol *et al.*, 2022b; Mtchedlidze *et al.*, 2022; Currie *et al.*, 2022b; Bhatnagar *et al.*, 2022; Haugen *et al.*, 2022; Becerra *et al.*, 2022b; Maiti *et al.*, 2022; Schober *et al.*, 2022a,b; Käpylä, 2022; Kirchschlager *et al.*, 2022; Bhat, 2022; Roper Pol *et al.*, 2022a; Mattsson and Hedvall, 2022; Karchniwy *et al.*, 2022),

49 times in 2021 (Barekat *et al.*, 2021; Yang and Zhu, 2021; Candelaresi and Del Sordo, 2021; Käpylä, 2021a; Kahniashvili *et al.*, 2022; Bhat, 2021; Mattsson and Hedvall, 2021; Zhou and Blackman, 2021; He *et al.*, 2021b; Bhatnagar *et al.*, 2021; Kirchschlager *et al.*, 2021; Hyder *et al.*, 2021; Brandenburg and Sharma, 2021; Warnecke *et al.*, 2021; Prabhu *et al.*, 2021; Brandenburg and Das, 2021; Schaffer *et al.*, 2021; Brandenburg *et al.*, 2021a; Maiti *et al.*, 2021; Brandenburg *et al.*, 2021d; Roper Pol *et al.*, 2022b; Brandenburg *et al.*, 2021b; Käpylä, 2021b; Becerra *et al.*, 2021; Oliveira *et al.*, 2021; Raettig *et al.*, 2021; Roper Pol, 2021; Haugen *et al.*, 2021a,b; He *et al.*, 2021a; Gent *et al.*, 2021; Klahr and Schreiber, 2021; Li and Mattsson, 2021; Kahniashvili *et al.*, 2021; Pencil Code Collaboration *et al.*, 2021; Santos-Lima *et al.*, 2021; Navarrete *et al.*, 2021; Jakab and Brandenburg, 2021; Pekkilä *et al.*, 2021; Baehr and Zhu, 2021a,b; Brandenburg *et al.*, 2021c; Zhu and Yang, 2021; Bhat *et al.*, 2021; Zhuleku *et al.*, 2021; Viviani *et al.*, 2021; Park and Cheoun, 2021; Viviani and Käpylä, 2021; Väisälä *et al.*, 2021),

41 times in 2020 (Barekat *et al.*, 2020; Hyder *et al.*, 2020; Brandenburg *et al.*, 2020b; Park, 2020; Klahr and Schreiber, 2020; Brandenburg and Furuya, 2020; Rüdiger *et al.*, 2020; Willamo *et al.*, 2020; Candelaresi and Del Sordo, 2020; Zhang *et al.*, 2020; Navarrete *et al.*, 2020; Pusztai *et al.*, 2020; Brandenburg, 2020a,b; Li and Mattsson, 2020; Adrover-González and Terradas, 2020; Brandenburg and Brüggén, 2020; Gerbig *et al.*, 2020; Seta *et al.*, 2020; Brandenburg and Boldyrev, 2020; Bhatnagar, 2020; Eriksson *et al.*, 2020; Käpylä *et al.*, 2020a,b; Aarnes *et al.*, 2020; Qian *et al.*, 2020; Gent *et al.*, 2020; Schober *et al.*, 2020a,b; Roper Pol *et al.*, 2020a,b; Brandenburg and Das, 2020; Singh *et al.*, 2020; Chatterjee, 2020; Bourdin, 2020; Warnecke and Bingert, 2020; Brandenburg and Chen, 2020; Navarrete *et al.*, 2020; Li *et al.*, 2020; Brandenburg and Scannapieco, 2020; Kahniashvili *et al.*, 2020),

39 times in 2019 (Evirgen and Gent, 2019; Park, 2019a,b; Rüdiger *et al.*, 2019; Gerbig *et al.*, 2019; Warnecke and Peter, 2019b,a; Käpylä, 2019; Evirgen *et al.*, 2019; Peng *et al.*, 2019; Viviani *et al.*, 2019; Bhat *et al.*, 2019; Nauman and Nättälä, 2019; Castrejon *et al.*, 2019; Candelaresi *et al.*, 2019; Baehr and Klahr, 2019; Rodrigues *et al.*, 2019; Hernandez *et al.*, 2019; Li *et al.*, 2019; Aarnes *et al.*, 2019b; Smiet *et al.*, 2019; Brandenburg *et al.*, 2019a,b; Brandenburg and Rempel, 2019; Käpylä *et al.*, 2019; Mattsson *et al.*, 2019b,a; Losada *et al.*, 2019; Seta and Beck, 2019; Rempel *et al.*, 2019; Manser *et al.*, 2019; Yang and Zhu, 2020; Mao *et al.*, 2019; Hedvall and Mattsson, 2019; Schober *et al.*, 2019; Brandenburg, 2019a,b; Aarnes *et al.*, 2019a; Karchniwy *et al.*, 2019),

32 times in 2018 (Käpylä *et al.*, 2018; Väisälä *et al.*, 2018; Warnecke, 2018; Warnecke *et al.*, 2018; Li *et al.*, 2018b; Schober *et al.*, 2018; Käpylä, 2018; McNally *et al.*, 2018; Zhang *et al.*, 2018b; Schaffer *et al.*, 2018; Lyra *et al.*, 2018; Brandenburg and Oughton, 2018; Yang *et al.*, 2018; Trivedi *et al.*, 2018; Viviani *et al.*, 2018; Bhatnagar *et al.*, 2018b,a; Schreiber and Klahr, 2018; Bushby *et al.*, 2018; Zhang and Yan, 2018; Bourdin and Brandenburg, 2018; Brandenburg *et al.*, 2018b,a; Bourdin *et al.*, 2018; Korsós *et al.*, 2018; Rice and Nayakshin, 2018; Richert *et al.*, 2018; Mitra *et al.*, 2018; Brandenburg and Chatterjee, 2018; Kuchner *et al.*, 2018; Perri and Brandenburg, 2018; Brandenburg, 2018),

31 times in 2017 (Bourdin, 2017; Yang *et al.*, 2017; Bhat *et al.*, 2017; Kahniashvili *et al.*, 2017; Aarnes *et al.*, 2017; Hollins *et al.*, 2017; Reppin and Banerjee, 2017; Singh *et al.*, 2017; Hord *et al.*, 2017; Lyra *et al.*, 2017; Baehr *et al.*, 2017; Park, 2017; Sharma *et al.*, 2017; Brandenburg and Kahniashvili, 2017; Käpylä *et al.*, 2017a,b; Haugen *et al.*, 2017; Gent *et al.*, 2017; Osano and Adams, 2017; Cameron *et al.*, 2017; Pekkilä *et al.*, 2017; Brandenburg *et al.*, 2017c,d,a,b,e; Aiyer *et al.*, 2017; Li *et al.*, 2017; Jabbari *et al.*, 2017; Rempel *et al.*, 2017; Smiet *et al.*, 2017),

24 times in 2016 (Chatterjee *et al.*, 2016; Chamandy, 2016; Chamandy *et al.*, 2016; Candelaresi *et al.*, 2016; Bhat *et al.*, 2016a; Adams and Osano, 2016; Osano and Adams, 2016a,b; Krüger *et al.*, 2016; Bhat *et al.*, 2016b; Yang and Johansen, 2016; Cole *et al.*, 2016; Kahniashvili *et al.*, 2016; Warnecke *et al.*, 2016; Jabbari *et al.*, 2016; Lambrechts *et al.*, 2016; Bourdin *et al.*, 2016; Threlfall *et al.*, 2016; Bhat and Brandenburg, 2016; Tian and Chen, 2016; Rodrigues *et al.*, 2016; Lyra *et al.*, 2016; Karak and Brandenburg, 2016; Yokoi and Brandenburg, 2016),

25 times in 2015 (Bourdin *et al.*, 2015; Singh and Jingade, 2015; Jabbari *et al.*, 2015; Jabbari, 2015; Chen *et al.*, 2015; Johansen *et al.*, 2015; Richert *et al.*, 2015; Park and Park, 2015; Park, 2015; Smiet *et al.*, 2015; Carrera *et al.*, 2015; Gibbons *et al.*, 2015; Baehr and Klahr, 2015; Snellman *et al.*, 2015; Babkovskaia *et al.*, 2015; Raettig *et al.*, 2015; Andrievsky *et al.*, 2015; Carrera *et al.*, 2015; Chaudhuri, 2015; Singh *et al.*, 2015; Lyra *et al.*, 2015; Karak *et al.*, 2015a,b; Brandenburg and Hubbard, 2015; Brandenburg *et al.*, 2015),

37 times in 2014 (Bourdin, 2014; Bourdin *et al.*, 2014; Carrera *et al.*, 2014; Yang and Johansen, 2014a; Adams and Osano, 2014; Yang and Johansen, 2014b; Subramanian and Brandenburg, 2014; Singh *et al.*, 2014; Jabbari and Brandenburg, 2014; Jabbari *et al.*, 2014; Karak *et al.*, 2014; Warnecke *et al.*, 2014; McNally *et al.*, 2014; Brandenburg *et al.*, 2014; Gibbons *et al.*, 2014; Pan and Padoan, 2014; Pan *et al.*, 2014a,b; Lyra, 2014; Bhat *et al.*, 2014; Losada *et al.*, 2014; Rheinhardt *et al.*, 2014; Mitra *et al.*, 2014; Turner *et al.*, 2014; Dittrich *et al.*, 2014; Brandenburg and Stepanov, 2014; Chian *et al.*, 2014; Brandenburg, 2014; Park, 2014b,a; Käpylä *et al.*, 2014; Modestov *et al.*, 2014; Cole *et al.*, 2014; Rüdiger and Brandenburg, 2014; Warnecke and Brandenburg, 2014; Barekat and Brandenburg, 2014; Väisälä *et al.*, 2014),

46 times in 2013 (Lyra and Kuchner, 2013; Bourdin *et al.*, 2013a,b; Félix *et al.*, 2013; Hubbard, 2013; Park *et al.*, 2013; Park, 2013a,b; Getling, 2013; Devlen *et al.*, 2013; Gent *et al.*, 2013a,b; Brandenburg and Lazarian, 2013; Pan and Padoan, 2013; Mitra *et al.*, 2013; van Wettum *et al.*, 2013; Candelaresi and Brandenburg, 2013a,b; Kahniashvili *et al.*, 2013; Lyra, 2013; Bhat and Subramanian, 2013; Raettig *et al.*, 2013; Del Sordo *et al.*, 2013; Chamandy *et al.*, 2013; Di Bernardo and Torkelsson, 2013; Jabbari *et al.*, 2013; Dittrich *et al.*, 2013; Bingert and Peter, 2013; Brandenburg and Rädler, 2013; Bykov *et al.*, 2013; Brandenburg, 2013; Warnecke *et al.*, 2013a,b,c; Rempel *et al.*, 2013; Mantere *et al.*, 2013; Kemel *et al.*, 2013a,b; Losada *et al.*, 2013; Käpylä *et al.*, 2013a,b,c; Svedin *et al.*, 2013; Brandenburg *et al.*, 2013a,b),

50 times in 2012 (Félix *et al.*, 2012; Losada *et al.*, 2012; Peter and Bingert, 2012; Lambrechts and Johansen, 2012; Kahniashvili *et al.*, 2012; Tevzadze *et al.*, 2012; Gent, 2012; Gibbons *et al.*, 2012; Latter and Papaloizou, 2012; Hubbard, 2012; Gaburov *et al.*, 2012; Yang and Krumholz, 2012; Lyra and Mac Low, 2012; McNally *et al.*, 2012a,b; Bonanno *et al.*, 2012; Haugen *et al.*, 2012; Park and Blackman, 2012a,b; Mantere and Cole, 2012; Rogachevskii *et al.*, 2012; Käpylä *et al.*, 2012a,b; Maron *et al.*, 2012; Horn *et al.*, 2012; Lyra and Kuchner, 2012; Yang *et al.*, 2012; Kitchatinov and Brandenburg, 2012; Brandenburg and Petrosyan, 2012; Hubbard and Brandenburg, 2012; Guerrero *et al.*, 2012; Rice *et al.*, 2012; Kemel *et al.*, 2012a,b; Rheinhardt and Brandenburg, 2012; Peter *et al.*, 2012; Brandenburg and Guerrero, 2012; Brandenburg *et al.*, 2012a,b,c,d; Rempel *et al.*, 2012; Del Sordo *et al.*, 2012; Candelaresi and Brandenburg, 2012; Snellman *et al.*, 2012a,b; Warnecke *et al.*, 2012a,b,c; Johansen *et al.*, 2012),

62 times in 2011 (Gastine and Dintrans, 2011a,b,c; Rice *et al.*, 2011; Käpylä *et al.*, 2011a,b,c; Mantere *et al.*, 2011; Rogachevskii *et al.*, 2011; Lambrechts, 2011; Johansen *et al.*, 2011a,b; Rädler *et al.*, 2011; Tarjei Jensen *et al.*, 2011; Oishi and Mac Low, 2011; Ruoskanen *et al.*, 2011; Fromang *et al.*, 2011; Hydle Rivedal *et al.*, 2011; Guerrero and Käpylä, 2011; Warnecke and Brandenburg, 2011b; Warnecke *et al.*, 2011a,b; Kemel *et al.*, 2011a,b,c; Bejarano *et al.*, 2011; Zacharias *et al.*, 2011a,b; Candelaresi and Brandenburg, 2011a,b; Candelaresi *et al.*, 2011a,b,c; Del Sordo and Brandenburg, 2011a,b; Cantiello *et al.*, 2011a,b; Rempel *et al.*, 2011; Flock *et al.*, 2011; Bingert and Peter, 2011; Käpylä and Korpi, 2011; Johansen *et al.*, 2011c; Rüdiger *et al.*, 2011; Lyra and Klahr, 2011; Mitra *et al.*, 2011; Babkovskaia

*et al.*, 2011; Hubbard and Brandenburg, 2011; Chatterjee *et al.*, 2011a,b,c; Chatterjee, 2011; Hubbard *et al.*, 2011; Guerrero *et al.*, 2011; Brandenburg and Nordlund, 2011; Warnecke and Brandenburg, 2011a; Brandenburg *et al.*, 2011a,b,c; Brandenburg, 2011a,b,c,d),

30 times in 2010 (Haugen *et al.*, 2010; Madarassy and Brandenburg, 2010; Gastine and Dintrans, 2010; Kahniashvili *et al.*, 2010; Lyra *et al.*, 2010; Johansen and Lacerda, 2010; Del Sordo *et al.*, 2010; Fromang *et al.*, 2010; Mitra *et al.*, 2010a,b,c; Korpi *et al.*, 2010; K  p  l   *et al.*, 2010a,b,c,d; Baggaley *et al.*, 2010; Brandenburg and Dobler, 2010; Guerrero *et al.*, 2010; Chatterjee *et al.*, 2010; R  dler and Brandenburg, 2010; Bingert *et al.*, 2010; Warnecke and Brandenburg, 2010; Hubbard and Brandenburg, 2010; Rheinhardt and Brandenburg, 2010; Brandenburg and Del Sordo, 2010; Brandenburg *et al.*, 2010a,b; Brandenburg, 2010a,b),

35 times in 2009 (Yang *et al.*, 2009; Baggaley *et al.*, 2009; Rempel *et al.*, 2009; Oishi and Mac Low, 2009; Snellman *et al.*, 2009; B  rve *et al.*, 2009; Vermersch and Brandenburg, 2009; Heinemann and Papaloizou, 2009; K  p  l   and Brandenburg, 2009; Johansen *et al.*, 2009a,b; Maron and Mac Low, 2009; Zacharias *et al.*, 2009a,b; Fromang *et al.*, 2009; Mitra *et al.*, 2009a,b; K  p  l   *et al.*, 2009a,b,c; Liljestr  m *et al.*, 2009; Lyra *et al.*, 2009a,b; Hubbard and Brandenburg, 2009; Sur and Brandenburg, 2009; Hubbard *et al.*, 2009; R  dler and Brandenburg, 2009; Brandenburg *et al.*, 2009a,b; Brandenburg, 2009a,b,c,d,e,f),

28 times in 2008 (Lyra *et al.*, 2008a,b; Gastine and Dintrans, 2008a,b,c; Johansen and Levin, 2008; Workman and Armitage, 2008; K  p  l   and Brandenburg, 2008; Klahr, 2008; Rieutord, 2008; Johansen *et al.*, 2008; Yousef *et al.*, 2008; Babkovskaia *et al.*, 2008; Scharmer *et al.*, 2008; Maron *et al.*, 2008; Ruszkowski *et al.*, 2008; Gellert *et al.*, 2008; R  dler and Brandenburg, 2008; Tilgner and Brandenburg, 2008; Sur *et al.*, 2008; K  p  l   *et al.*, 2008; Youdin and Johansen, 2008; Green *et al.*, 2008; Brandenburg *et al.*, 2008a,b,c; Brandenburg, 2008a,b),

19 times in 2007 (K  p  l   and Brandenburg, 2007; Fromang *et al.*, 2007; Fromang and Papaloizou, 2007; Oishi *et al.*, 2007; Heinemann *et al.*, 2007; Brandenburg and K  p  l  , 2007; Schekochihin *et al.*, 2007; Gustafsson *et al.*, 2007; Ruszkowski *et al.*, 2007; Johansen and Youdin, 2007; Youdin and Johansen, 2007; Johansen *et al.*, 2007a,b; Sur *et al.*, 2007; Brandenburg and Subramanian, 2007; Brandenburg *et al.*, 2007a,b; Brandenburg, 2007a,b),

18 times in 2006 (Ouyed *et al.*, 2006; Hupfer *et al.*, 2006; Fromang *et al.*, 2006; de Val-Borro *et al.*, 2006; Haugen and Brandenburg, 2006; Johansen *et al.*, 2006a,b,c; Shukurov *et al.*, 2006; Mee and Brandenburg, 2006; Snodin *et al.*, 2006; Brandenburg and Dintrans, 2006; Gustafsson *et al.*, 2006; Heinemann *et al.*, 2006; Dobler *et al.*, 2006; Brandenburg, 2006a,b,c),

19 times in 2005 (Johansen and Klahr, 2005; McMillan and Sarson, 2005; Schekochihin *et al.*, 2005; Dorch, 2005; Johansen *et al.*, 2005; Christensson *et al.*, 2005; Brandenburg and R  diger, 2005; Brandenburg and Blackman, 2005; Brandenburg and K  p  l  , 2005; Brandenburg and Subramanian, 2005a,b,c; Brandenburg *et al.*, 2005a,b; Brandenburg, 2005a; Brandenburg *et al.*, 2005c; Brandenburg, 2005b,c,d),

19 times in 2004 (Nordlund, 2004; Brandenburg and Sandin, 2004; Brandenburg and Multamäki, 2004; Dorch, 2004a,b; Haugen and Brandenburg, 2004a,b; Haugen *et al.*, 2004a,b,c; Yousef *et al.*, 2004; Johansen *et al.*, 2004; Maron *et al.*, 2004; Pearson *et al.*, 2004; Brandenburg and Matthaeus, 2004; Dobler and Getling, 2004; Brandenburg *et al.*, 2004a,b,c),

and 7 times in 2003 (Yousef *et al.*, 2003; Yousef and Brandenburg, 2003; McMillan and Sarson, 2003; Haugen *et al.*, 2003; Brandenburg, 2003; Brandenburg *et al.*, 2003; Dobler *et al.*, 2003).

## 2 Papers by topic

The PENCIL CODE has been used for the following research topics

### 1. Interstellar and intercluster medium as well as early Universe

- (a) *Interstellar and intercluster medium* (Gent *et al.*, 2023; Brandenburg and Ntormousi, 2022; Maiti *et al.*, 2021; Gent *et al.*, 2021; Li and Mattsson, 2021; Candelaresi and Del Sordo, 2021, 2020; Li and Mattsson, 2020; Brandenburg and Furuya, 2020; Brandenburg and Brüggén, 2020; Gent *et al.*, 2020; Evirgen and Gent, 2019; Evirgen *et al.*, 2019; Seta and Beck, 2019; Rodrigues *et al.*, 2019; Brandenburg, 2019a; Väisälä *et al.*, 2018; Zhang *et al.*, 2018b; Zhang and Yan, 2018; Hollins *et al.*, 2017; Hord *et al.*, 2017; Chamandy, 2016; Chamandy *et al.*, 2016; Rodrigues *et al.*, 2016; Chamandy *et al.*, 2013; Gent *et al.*, 2013a,b; Bykov *et al.*, 2013; Gent, 2012; Yang and Krumholz, 2012; Mantere and Cole, 2012; Rogachevskii *et al.*, 2012; Ruoskanen *et al.*, 2011; Ruszkowski *et al.*, 2007, 2008; Brandenburg *et al.*, 2007b; Gustafsson *et al.*, 2006, 2007; Brandenburg *et al.*, 2005a; Haugen *et al.*, 2004b; Brandenburg *et al.*, 2003).
- (b) *Small-scale dynamos and reconnection* (Gent *et al.*, 2022; Brandenburg *et al.*, 2023b; Zhou *et al.*, 2022; Bhat, 2021; Park and Cheoun, 2021; Santos-Lima *et al.*, 2021; Park, 2020; Pusztai *et al.*, 2020; Rüdiger *et al.*, 2020; Seta *et al.*, 2020; Käpylä, 2019; Bhat *et al.*, 2019; Brandenburg and Rempel, 2019; Brandenburg *et al.*, 2018a; Käpylä *et al.*, 2018; Bhat *et al.*, 2016b; Bhat and Subramanian, 2013; Brandenburg, 2011c; Baggaley *et al.*, 2009, 2010; Schekochihin *et al.*, 2005, 2007; Haugen and Brandenburg, 2004b; Haugen *et al.*, 2003, 2004a,c; Dobler *et al.*, 2003).
- (c) *Primordial magnetic fields and decaying turbulence* (Mtchedlidze *et al.*, 2023, 2022; Bhat *et al.*, 2021; Brandenburg, 2023a, 2020a; Brandenburg *et al.*, 2020b, 2019b; Kahniashvili *et al.*, 2020; Brandenburg *et al.*, 2018b; Trivedi *et al.*, 2018; Brandenburg *et al.*, 2017d; Brandenburg and Kahniashvili, 2017; Kahniashvili *et al.*, 2017; Reppin and Banerjee, 2017; Park, 2017; Osano and Adams, 2017; Adams and Osano, 2016; Osano and Adams, 2016b,a; Kahniashvili *et al.*, 2016; Brandenburg *et al.*, 2015; Adams and Osano, 2014; Kahniashvili *et al.*, 2012, 2013; Tevzadze *et al.*, 2012; Candelaresi and Brandenburg, 2011a; Kahniashvili *et al.*, 2010; Del Sordo *et al.*, 2010; Christensson *et al.*, 2005; Yousef *et al.*, 2004).
- (d) *Gravitational waves from turbulent sources* (He *et al.*, 2022; Roper Pol, 2022; Sharma and Brandenburg, 2022; AlbertoRoper, 2022; Kahniashvili *et al.*, 2022; Roper Pol, 2021;

Roper Pol *et al.*, 2022b; He *et al.*, 2021b,a; Brandenburg *et al.*, 2021b,d; Brandenburg and Sharma, 2021; Brandenburg *et al.*, 2021a,c; Kahnashvili *et al.*, 2021; Roper Pol *et al.*, 2020b,a).

## 2. Planet formation and inertial particles

- (a) *Planet formation* (Baehr *et al.*, 2022; Yang and Zhu, 2021; Raettig *et al.*, 2021; Baehr and Zhu, 2021b,a; Zhu and Yang, 2021; Klahr and Schreiber, 2021, 2020; Yang and Zhu, 2020; Eriksson *et al.*, 2020; Gerbig *et al.*, 2020; Castrejon *et al.*, 2019; Baehr and Klahr, 2019; McNally *et al.*, 2018; Schreiber and Klahr, 2018; Hernandez *et al.*, 2019; Manser *et al.*, 2019; Yang *et al.*, 2018; Rice and Nayakshin, 2018; Richert *et al.*, 2018; Kuchner *et al.*, 2018; Baehr *et al.*, 2017; Lyra *et al.*, 2016; Yang and Johansen, 2016; Lambrechts *et al.*, 2016; Johansen *et al.*, 2015; Richert *et al.*, 2015; Gibbons *et al.*, 2015; Baehr and Klahr, 2015; Carrera *et al.*, 2015, 2014; Yang and Johansen, 2014a,b; McNally *et al.*, 2014; Turner *et al.*, 2014; Gibbons *et al.*, 2014; Dittrich *et al.*, 2014, 2013; Hubbard, 2013; Lyra and Kuchner, 2013; Gibbons *et al.*, 2012; Hubbard, 2012; Horn *et al.*, 2012; Lyra and Kuchner, 2012; Yang *et al.*, 2012; Lambrechts and Johansen, 2012; Johansen *et al.*, 2012; Fromang *et al.*, 2011; Johansen *et al.*, 2011c; Lambrechts, 2011; Johansen *et al.*, 2011a,b; Lyra and Klahr, 2011; Lyra *et al.*, 2010; Johansen and Lacerda, 2010; Yang *et al.*, 2009; Johansen *et al.*, 2009b; Oishi and Mac Low, 2009; Børve *et al.*, 2009; Lyra *et al.*, 2009a,b, 2008a; Johansen *et al.*, 2008; Lyra *et al.*, 2008b; Youdin and Johansen, 2008; Oishi *et al.*, 2007; Johansen *et al.*, 2007a,b; Johansen and Youdin, 2007; Youdin and Johansen, 2007; Johansen *et al.*, 2006a,b,c; Johansen and Klahr, 2005; Johansen *et al.*, 2004, 2005).
- (b) *Inertial, tracer particles, & passive scalars* (Sengupta and Umurhan, 2023; Li *et al.*, 2022; Kirchschrager *et al.*, 2021; Mattsson and Hedvall, 2021; Schaffer *et al.*, 2021; Haugen *et al.*, 2021a,b; Bhatnagar *et al.*, 2021; Bhatnagar, 2020; Li *et al.*, 2020; Mattsson *et al.*, 2019a; Gerbig *et al.*, 2019; Li *et al.*, 2019; Aarnes *et al.*, 2019b; Mattsson *et al.*, 2019b; Hedvall and Mattsson, 2019; Lyra *et al.*, 2018; Bhatnagar *et al.*, 2018a; Schaffer *et al.*, 2018; Mitra *et al.*, 2018; Bhatnagar *et al.*, 2018b; Yang *et al.*, 2017; Aarnes *et al.*, 2017; Sharma *et al.*, 2017; Haugen *et al.*, 2017; Li *et al.*, 2017; Krüger *et al.*, 2016; Raettig *et al.*, 2015; Pan and Padoan, 2014, 2013; Pan *et al.*, 2014b,a; Mitra *et al.*, 2013; Haugen *et al.*, 2012; Hydle Rivedal *et al.*, 2011; Haugen *et al.*, 2010).

## 3. Accretion discs and shear flows

- (a) *Accretion discs and shear flows* (Meftah, 2023; Tharakkal *et al.*, 2022; Hyder *et al.*, 2022, 2021, 2020; Bhat *et al.*, 2017; Singh *et al.*, 2017; Lyra *et al.*, 2017; Bhat *et al.*, 2016a; Tian and Chen, 2016; Lyra, 2014; Lyra *et al.*, 2015; Väisälä *et al.*, 2014; Lyra, 2013; Raettig *et al.*, 2013; Di Bernardo and Torkelsson, 2013; Latter and Papaloizou, 2012; Gaburov *et al.*, 2012; Lyra and Mac Low, 2012; Rice *et al.*, 2011, 2012; Oishi and Mac Low, 2011; Flock *et al.*, 2011; Käpylä *et al.*, 2010a; Käpylä and Korpi, 2011;

Fromang *et al.*, 2010; Korpi *et al.*, 2010; Johansen *et al.*, 2009a; Heinemann and Papaloizou, 2009; Fromang *et al.*, 2009; Johansen and Levin, 2008; Workman and Armitage, 2008; Fromang *et al.*, 2007; Fromang and Papaloizou, 2007; Ouyed *et al.*, 2006; Brandenburg, 2005d).

- (b) *Shear flows* (Barekat *et al.*, 2020; Singh and Jingade, 2015; Modestov *et al.*, 2014; Vermersch and Brandenburg, 2009; Käpylä *et al.*, 2009c; Green *et al.*, 2008; Yousef *et al.*, 2008; Babkovskaia *et al.*, 2008; Brandenburg *et al.*, 2004a).

#### 4. Solar physics

- (a) *Coronal heating and coronal mass ejections* (Zhang *et al.*, 2023; Jakab and Brandenburg, 2021; Zhuleku *et al.*, 2021; Adrover-González and Terradas, 2020; Bourdin, 2014, 2017, 2020; Bourdin *et al.*, 2013a,b, 2014, 2015, 2016; Chatterjee, 2020; Warnecke and Bingert, 2020; Candelaresi *et al.*, 2019; Warnecke and Peter, 2019b; Smiet *et al.*, 2019; Warnecke and Peter, 2019a; Korsós *et al.*, 2018; Cameron *et al.*, 2017; Chatterjee *et al.*, 2016; Candelaresi *et al.*, 2016; Threlfall *et al.*, 2016; Chen *et al.*, 2015; Smiet *et al.*, 2015; Warnecke and Brandenburg, 2014; van Wettum *et al.*, 2013; Bingert and Peter, 2013; Peter and Bingert, 2012; Peter *et al.*, 2012; Warnecke *et al.*, 2012a,b; Warnecke and Brandenburg, 2011a; Zacharias *et al.*, 2011a,b; Warnecke *et al.*, 2011b; Bingert and Peter, 2011; Warnecke and Brandenburg, 2011b; Warnecke *et al.*, 2011a; Warnecke and Brandenburg, 2010; Bingert *et al.*, 2010; Zacharias *et al.*, 2009b,a).
- (b) *Large-scale dynamos, helical turbulence, and catastrophic quenching* (Park *et al.*, 2023; Yang and Zhu, 2022; Prabhu *et al.*, 2021; Brandenburg and Scannapieco, 2020; Park, 2019a; Peng *et al.*, 2019; Nauman and Nättilä, 2019; Park, 2019b; Brandenburg and Oughton, 2018; Bourdin *et al.*, 2018; Bourdin and Brandenburg, 2018; Brandenburg, 2018; Brandenburg and Chatterjee, 2018; Rempel *et al.*, 2019; Brandenburg *et al.*, 2017a,c,b; Rempel *et al.*, 2017; Smiet *et al.*, 2017; Cole *et al.*, 2016; Karak and Brandenburg, 2016; Karak *et al.*, 2015b; Brandenburg and Hubbard, 2015; Subramanian and Brandenburg, 2014; Brandenburg and Stepanov, 2014; Brandenburg, 2014; Bhat *et al.*, 2014; Chian *et al.*, 2014; Park, 2014b; Park *et al.*, 2013; Brandenburg and Lazarian, 2013; Park, 2013b,a, 2014a; Candelaresi and Brandenburg, 2013a; Park, 2013a; Del Sordo *et al.*, 2013; Brandenburg, 2013; Rempel *et al.*, 2013; Candelaresi and Brandenburg, 2013b, 2012; Brandenburg *et al.*, 2012d; Rempel *et al.*, 2012; Park and Blackman, 2012b,a; Brandenburg and Guerrero, 2012; Brandenburg, 2011a; Hubbard and Brandenburg, 2012; Rempel *et al.*, 2011; Mitra *et al.*, 2011; Candelaresi *et al.*, 2011b; Hubbard and Brandenburg, 2011; Brandenburg, 2011b; Chatterjee *et al.*, 2011a; Hubbard *et al.*, 2011; Candelaresi *et al.*, 2011c; Candelaresi and Brandenburg, 2011b; Candelaresi *et al.*, 2011a; Brandenburg, 2011d; Guerrero *et al.*, 2011; Hubbard and Brandenburg, 2010; Mitra *et al.*, 2010a,b; Brandenburg, 2010b; Guerrero *et al.*, 2010; Brandenburg, 2010a; Brandenburg *et al.*, 2010a; Chatterjee *et al.*, 2010; Rädler and Brandenburg, 2010; Rempel *et al.*, 2009; Käpylä and Brandenburg, 2009; Brandenburg, 2009a,e; Brandenburg *et al.*, 2009a; Brandenburg, 2009d,f; Sur and Brandenburg, 2009; Brandenburg, 2009b,c; Rädler and Brandenburg, 2008; Tilgner and Brandenburg, 2008;



Brandenburg, 2008a; Brandenburg *et al.*, 2008c; Brandenburg, 2008b; Brandenburg and Käpylä, 2007; Brandenburg and Subramanian, 2007; Brandenburg, 2007b,a, 2006c,b; Shukurov *et al.*, 2006; Mee and Brandenburg, 2006; Snodin *et al.*, 2006; Brandenburg and Dintrans, 2006; Brandenburg, 2006a; Brandenburg *et al.*, 2005b; Brandenburg and Subramanian, 2005c,b; Brandenburg and Käpylä, 2005; Brandenburg, 2005a; Brandenburg and Blackman, 2005; Brandenburg and Subramanian, 2005a; Brandenburg, 2005b,c; Brandenburg *et al.*, 2004c; Brandenburg and Matthaeus, 2004; Brandenburg and Sandin, 2004; Yousef and Brandenburg, 2003).

- (c) *Helioseismology* (Singh *et al.*, 2014, 2015, 2020).
- (d) *Strongly stratified MHD turbulence and NEMPI* (Losada *et al.*, 2019; Perri and Brandenburg, 2018; Jabbari *et al.*, 2017, 2016; Warnecke *et al.*, 2016; Jabbari, 2015; Brandenburg *et al.*, 2014; Losada *et al.*, 2014; Mitra *et al.*, 2014; Jabbari and Brandenburg, 2014; Jabbari *et al.*, 2014, 2015; Brandenburg *et al.*, 2013b; Warnecke *et al.*, 2013c; Jabbari *et al.*, 2013; Kemel *et al.*, 2013a,b, 2012a,b, 2011a,b,c; Losada *et al.*, 2013; Käpylä *et al.*, 2013a; Losada *et al.*, 2012; Käpylä *et al.*, 2012a; Brandenburg *et al.*, 2010b, 2011c, 2012a; Rüdiger *et al.*, 2011).
- (e) *Convection in Cartesian domains* (Tschernitz and Bourdin, 2022; Masada and Sano, 2022; Ortiz-Rodríguez *et al.*, 2022; Käpylä, 2022, 2021a; Brandenburg *et al.*, 2019a; Käpylä, 2018; Bushby *et al.*, 2018; Käpylä *et al.*, 2017b; Félix *et al.*, 2013; Käpylä *et al.*, 2013b; Getling, 2013; Félix *et al.*, 2012; Svedin *et al.*, 2013; Guerrero *et al.*, 2012; Gastine and Dintrans, 2011c; Mantere *et al.*, 2011; Käpylä *et al.*, 2011c; Guerrero and Käpylä, 2011; Cantiello *et al.*, 2011a,b; Gastine and Dintrans, 2008a,b, 2010, 2011a,b; Brandenburg *et al.*, 2011b; Käpylä *et al.*, 2008, 2009b, 2010b; Scharmer *et al.*, 2008; Rieutord, 2008; Heinemann *et al.*, 2007, 2006; Nordlund, 2004; Dobler and Getling, 2004).
- (f) *Global convection and dynamo simulations* (Hidalgo *et al.*, 2023; Käpylä, 2023; Warnecke *et al.*, 2021; Käpylä, 2021b; Navarrete *et al.*, 2022, 2021, 2020; Becerra *et al.*, 2022a,b, 2021; Viviani *et al.*, 2021; Viviani and Käpylä, 2021; Willamo *et al.*, 2020; Jakab and Brandenburg, 2020; Käpylä *et al.*, 2020b; Viviani *et al.*, 2019; Rüdiger *et al.*, 2019; Käpylä *et al.*, 2019; Warnecke, 2018; Viviani *et al.*, 2018; Käpylä *et al.*, 2017a; Gent *et al.*, 2017; Karak *et al.*, 2015a; Warnecke *et al.*, 2014; Cole *et al.*, 2014; Käpylä *et al.*, 2010d, 2011a,b, 2012b, 2013c, 2014; Mantere *et al.*, 2013; Warnecke *et al.*, 2012c, 2013a,b; Mitra *et al.*, 2009b, 2010c; Brandenburg *et al.*, 2007a; Dobler *et al.*, 2006; McMillan and Sarson, 2005; Dorch, 2004a,b, 2005; McMillan and Sarson, 2003).

## 5. Miscellanea

- (a) *Turbulent transport and test-field method* (Mizerski *et al.*, 2023; Carenza *et al.*, 2022; Zhou and Blackman, 2023; Käpylä and Singh, 2022; Zhou and Blackman, 2021; Käpylä *et al.*, 2022; Haugen *et al.*, 2021a; Käpylä *et al.*, 2020a; Brandenburg and Chen, 2020; Warnecke *et al.*, 2018; Andrievsky *et al.*, 2015; Snellman *et al.*, 2015; Karak *et al.*, 2014; Rheinhardt *et al.*, 2014; Rüdiger and Brandenburg, 2014; Devlen *et al.*, 2013;

- Brandenburg *et al.*, 2004b, 2008a,b, 2009b, 2012b,c, 2013a; Brandenburg and Rädler, 2013; Snellman *et al.*, 2009, 2012a,b; Kitchatinov and Brandenburg, 2012; Rheinhardt and Brandenburg, 2010, 2012; Rogachevskii *et al.*, 2011; Rädler *et al.*, 2011; Chatterjee, 2011; Brandenburg and Del Sordo, 2010; Madarassy and Brandenburg, 2010; Käpylä *et al.*, 2010c; Hubbard and Brandenburg, 2009; Hubbard *et al.*, 2009; Rädler and Brandenburg, 2009; Käpylä *et al.*, 2009a; Mitra *et al.*, 2009a; Liljeström *et al.*, 2009; Sur *et al.*, 2008; Käpylä and Brandenburg, 2007, 2008; Sur *et al.*, 2007; Hupfer *et al.*, 2006; Yousef *et al.*, 2003).
- (b) *Hydrodynamic and MHD instabilities* (Oliveira *et al.*, 2021; Del Sordo *et al.*, 2012; Chatterjee *et al.*, 2011b,c; Bejarano *et al.*, 2011; Brandenburg and Rüdiger, 2005; Brandenburg *et al.*, 2004c; Brandenburg, 2003).
  - (c) *Chiral MHD* (Brandenburg *et al.*, 2023a; Schober *et al.*, 2022a,b, 2020a,b, 2019, 2018; Brandenburg *et al.*, 2017e).
  - (d) *Hydrodynamic and MHD turbulence* (Brandenburg *et al.*, 2023c; Brandenburg and Boldyrev, 2020; Aiyer *et al.*, 2017; Yokoi and Brandenburg, 2016; Brandenburg and Petrosyan, 2012; Del Sordo and Brandenburg, 2011a,b; Brandenburg and Nordlund, 2011; Haugen and Brandenburg, 2004a, 2006; Brandenburg *et al.*, 2005c; Pearson *et al.*, 2004).
  - (e) *Turbulent combustion, front propagation, radiation & ionization* (Yuvraj *et al.*, 2023; Lipatnikov and Sabelnikov, 2022; Karchniwy *et al.*, 2022; Bhatia and De, 2021; Zhang *et al.*, 2020; Aarnes *et al.*, 2020; Brandenburg and Das, 2021, 2020; Qian *et al.*, 2020; Brandenburg, 2023b, 2020b, 2019b; Mao *et al.*, 2019; Bhat and Brandenburg, 2016; Babkovskaia *et al.*, 2015; Chaudhuri, 2015; Barekat and Brandenburg, 2014; Tarjei Jensen *et al.*, 2011; Brandenburg *et al.*, 2011a; Babkovskaia *et al.*, 2011; Brandenburg and Multamäki, 2004).
  - (f) *Code development, GPU etc* (Pencil Code Collaboration *et al.*, 2021; Pekkilä *et al.*, 2021, 2017).

### 3 Code comparison & reference

The PENCIL CODE has been quoted in other papers either for detailed code comparison, in connection with related work, or in comparison with other codes (Commerçon *et al.*, 2023; Paardekooper *et al.*, 2022; Chouliaras and Gourgoulatos, 2022; Caldwell *et al.*, 2022; Porter *et al.*, 2022; Li and Youdin, 2021; Zhu, 2021; Sabelnikov *et al.*, 2021; Bartman *et al.*, 2021; Hanawa and Matsumoto, 2021; Bhatia and De, 2021; Väisälä *et al.*, 2021; Brandenburg, 2020c; Pencil Code Collaboration, 2020; Guerrero, 2020; Gressel and Elstner, 2020; Matilsky and Toomre, 2020; Brandenburg *et al.*, 2020a; Rosswog, 2020; Beresnyak, 2019; Sapetina *et al.*, 2019; Rosswog, 2019; Mignone *et al.*, 2019; Tricco, 2019; Jóhannesson *et al.*, 2019; Porter *et al.*, 2019; Zhang *et al.*, 2018a; Li *et al.*, 2018a; Nixon *et al.*, 2018; Rüdiger *et al.*, 2018; Hernandez *et al.*, 2018; Oishi *et al.*, 2018; Augustson, 2017b; Yamamoto and Makino, 2017; Goffrey *et al.*, 2017; Augustson, 2017a; Ryu and Huynh, 2017; Cabezón *et al.*, 2017; Emeriau-Viard and Brun, 2017; Brun and Browning,

2017; Kupka and Muthsam, 2017; Kulikov *et al.*, 2016; Surville *et al.*, 2016; Simon *et al.*, 2016; Skála *et al.*, 2015; Mocz *et al.*, 2015; Hopkins, 2015; Duffell and MacFadyen, 2015; Krumholz and Forbes, 2015; Cheung *et al.*, 2015; Augustson *et al.*, 2015; Schad *et al.*, 2015; Brun *et al.*, 2015; Norton *et al.*, 2014; Rieutord, 2014; Olshevsky *et al.*, 2014; Skála *et al.*, 2014; Jenkins *et al.*, 2014; Lovelace and Romanova, 2014; Recchi, 2014; Berera and Linkmann, 2014; Norton *et al.*, 2014; Charbonneau, 2014, 2013; Augustson *et al.*, 2013; Gabbasov *et al.*, 2013; Kulikov, 2013; Fromang, 2013; Martínez Pillet, 2013; Cavecchi *et al.*, 2013; Rein, 2012; Freytag *et al.*, 2012; McNally *et al.*, 2012a; Bonanno *et al.*, 2012; Maron *et al.*, 2012; McNally *et al.*, 2012b; Andic, 2011; Viallet *et al.*, 2011; McNally, 2011; Vshivkov *et al.*, 2011; Ziegler, 2011; Hanasz *et al.*, 2010; Brandenburg and Dobler, 2010; Rovithis-Livanou, 2010; Bai and Stone, 2010; Stone and Gardiner, 2010; Turck-Chièze, 2010; Garcia de Andrade, 2009; Kley, 2009; Piontek *et al.*, 2009; Maron and Mac Low, 2009; Hawley, 2009; Lemaster and Stone, 2009; Matsumoto and Seki, 2008; Maron *et al.*, 2008; Gellert *et al.*, 2008; Klahr, 2008; Thévenin *et al.*, 2006; Fromang *et al.*, 2006; de Val-Borro *et al.*, 2006; Turner *et al.*, 2006; Rüdiger, 2005; Maron *et al.*, 2004).

## References

- Aarnes, J.R., Haugen, N.E.L. and Andersson, H., Inertial particle impaction on a cylinder in turbulent cross flow at modest Reynolds numbers. *Int. J. of Multiphase flow*, 2019a, **111**, 53–61.
- Aarnes, J.R., Haugen, N.E.L. and Andersson, H.I., Particle-laden flow past a cylinder resolved with IBM and overset grids; in *APS Division of Fluid Dynamics Meeting Abstracts*, Nov., 2017, p. D37.001.
- Aarnes, J.R., Haugen, N.E.L. and Andersson, H.I., High-order overset grid method for detecting particle impaction on a cylinder in a cross flow. *Int. J. Comput. Fluid Dynam.*, 2019b, **33**, 43–58.
- Aarnes, J.R., Jin, T., Mao, C., Haugen, N.E.L., Luo, K. and Andersson, H.I., Treatment of solid objects in the Pencil Code using an immersed boundary method and overset grids. *Geophys. Astrophys. Fluid Dynam.*, 2020, **114**, 35–57.
- Adams, P. and Osano, B., Magnetogenesis Experiments Using a Modified Chaplygin Gas EoS. *arXiv:1412.1940*, 2014.
- Adams, P.W.M. and Osano, B., Technical Considerations in Magnetic Analogue Models. *arXiv:1606.06725*, 2016.
- Adrover-González, A. and Terradas, J., 3D numerical simulations of oscillations in solar prominences. *Astron. Astrophys.*, 2020, **633**, A113.
- Aiyer, A.K., Subramanian, K. and Bhat, P., Passive scalar mixing and decay at finite correlation times in the Batchelor regime. *J. Fluid Mech.*, 2017, **824**, 785–817.
- AlbertoRoper, AlbertoRoper/GW\_turbulence: v1.0.0, Zenodo 2022.
- Andic, A., Umbral Dots Observed in Photometric Images Taken with 1.6 m Solar Telescope. *Serb. Astron. J.*, 2011, **183**, 87–94.
- Andrievsky, A., Brandenburg, A., Noullez, A. and Zheligovsky, V., Negative Magnetic Eddy Diffusivities from the Test-field Method and Multiscale Stability Theory. *Astrophys. J.*, 2015, **811**, 135.
- Augustson, K., Dynamos and Differential Rotation: Advances at the Crossroads of Analytics, Numerics, and Observations. *arXiv:1701.02591*, 2017a.
- Augustson, K., Brun, A.S., Miesch, M.S. and Toomre, J., Cycling Dynamo in a Young Sun: Grand Minima and Equatorward Propagation. *arXiv:1310.8417*, 2013.
- Augustson, K., Brun, A.S., Miesch, M.S. and Toomre, J., Grand Minima and Equatorward Propagation in a Cycling Stellar Convective Dynamo. *Astrophys. J.*, 2015, **809**, 149.
- Augustson, K., Dynamos and Differential Rotation: Advances at the Crossroads of Analytics, Numerics, and Observations; in *Europ. Phys. J. Web Conf.*, Vol. 160, Oct., 2017b, p. 02010.
- Babkovskaia, N., Boy, M., Smolander, S., Romakkaniemi, S., Rannik, U. and Kulmala, M., A study of aerosol activation at the cloud edge with high resolution numerical simulations. *Atmosph. Res.*, 2015, **153**, 49–58.
- Babkovskaia, N., Brandenburg, A. and Poutanen, J., Boundary layer on the surface of a neutron star. *Month. Not. Roy. Astron. Soc.*, 2008, **386**, 1038–1044.
- Babkovskaia, N., Haugen, N.E.L. and Brandenburg, A., A high-order public domain code for direct numerical simulations of turbulent combustion. *J. Comp. Phys.*, 2011, **230**, 1–12.
- Baehr, H. and Klahr, H., The Role of the Cooling Prescription for Disk Fragmentation: Numerical Convergence and Critical Cooling Parameter in Self-gravitating Disks. *Astrophys. J.*, 2015, **814**, 155.
- Baehr, H. and Klahr, H., The Concentration and Growth of Solids in Fragmenting Circumstellar Disks. *Astrophys. J.*, 2019, **881**, 162.

- Baehr, H., Klahr, H. and Kratter, K.M., The Fragmentation Criteria in Local Vertically Stratified Self-gravitating Disk Simulations. *Astrophys. J.*, 2017, **848**, 40.
- Baehr, H. and Zhu, Z., Particle Dynamics in 3D Self-gravitating Disks. I. Spirals. *Astrophys. J.*, 2021a, **909**, 135.
- Baehr, H. and Zhu, Z., Particle Dynamics in 3D Self-gravitating Disks II: Strong Gas Accretion and Thin Dust Disks. *arXiv e-prints*, 2021b, arXiv:2101.01891.
- Baehr, H., Zhu, Z. and Yang, C.C., Direct Formation of Planetary Embryos in Self-gravitating Disks. *Astrophys. J.*, 2022, **933**, 100.
- Baggaley, A.W., Barenghi, C.F., Shukurov, A. and Subramanian, K., Reconnecting flux-rope dynamo. *Phys. Rev. E*, 2009, **80**, 055301.
- Baggaley, A.W., Shukurov, A., Barenghi, C.F. and Subramanian, K., Fluctuation dynamo based on magnetic reconnections. *Astron. Nachr.*, 2010, **331**, 46.
- Bai, X.N. and Stone, J.M., Dynamics of Solids in the Midplane of Protoplanetary Disks: Implications for Planetesimal Formation. *Astrophys. J.*, 2010, **722**, 1437–1459.
- Barekat, A. and Brandenburg, A., Near-polytropic stellar simulations with a radiative surface. *Astron. Astrophys.*, 2014, **571**, A68.
- Barekat, A., Käpylä, M.J., Käpylä, P.J., Gilson, E.P. and Ji, H., Generation of mean flows in rotating anisotropic turbulence: The case of solar near-surface shear layer. *arXiv e-prints*, 2020, arXiv:2012.06343.
- Barekat, A., Käpylä, M.J., Käpylä, P.J., Gilson, E.P. and Ji, H., Generation of mean flows in rotating anisotropic turbulence: The case of solar near-surface shear layer. *Astron. Astrophys.*, 2021, **655**, A79.
- Bartman, P., Arabas, S., Górski, K., Jaruga, A., Lazarski, G., Oleśik, M., Piasecki, B. and Talar, A., PySDM v1: particle-based cloud modelling package for warm-rain microphysics and aqueous chemistry. *arXiv e-prints*, 2021, arXiv:2103.17238.
- Becerra, L., Reisenegger, A., Valdivia, J.A. and Gusakov, M., Stellar Magnetic Equilibria with the Pencil Code; in *OBA Stars: Variability and Magnetic Fields. On-line conference*, Jun., 2021, p. 21.
- Becerra, L., Reisenegger, A., Valdivia, J.A. and Gusakov, M., Stability of axially symmetric magnetic fields in stars. *Month. Not. Roy. Astron. Soc.*, 2022a, **517**, 560–568.
- Becerra, L., Reisenegger, A., Valdivia, J.A. and Gusakov, M.E., Evolution of random initial magnetic fields in stably stratified and barotropic stars. *Month. Not. Roy. Astron. Soc.*, 2022b, **511**, 732–745.
- Bejarano, C., Gómez, D.O. and Brandenburg, A., Shear-driven Instabilities in Hall-magnetohydrodynamic Plasmas. *Astrophys. J.*, 2011, **737**, 62.
- Berera, A. and Linkmann, M., Magnetic helicity and the evolution of decaying magnetohydrodynamic turbulence. *Phys. Rev. E*, 2014, **90**, 041003.
- Beresnyak, A., MHD turbulence. *Living Reviews in Computational Astrophysics*, 2019, **5**, 2.
- Bhat, P., Blackman, E.G. and Subramanian, K., Resilience of helical fields to turbulent diffusion - II. Direct numerical simulations. *Month. Not. Roy. Astron. Soc.*, 2014, **438**, 2954–2966.
- Bhat, P. and Brandenburg, A., Hydraulic effects in a radiative atmosphere with ionization. *Astron. Astrophys.*, 2016, **587**, A90.
- Bhat, P., Ebrahimi, F. and Blackman, E.G., Large-scale dynamo action precedes turbulence in shearing box simulations of the magnetorotational instability. *Month. Not. Roy. Astron. Soc.*, 2016a, **462**, 818–829.
- Bhat, P., Ebrahimi, F., Blackman, E.G. and Subramanian, K., Evolution of the magnetorotational instability on initially tangled magnetic fields. *Month. Not. Roy. Astron. Soc.*, 2017, **472**, 2569–2574.
- Bhat, P. and Subramanian, K., Fluctuation dynamos and their Faraday rotation signatures. *Month. Not. Roy. Astron. Soc.*, 2013, **429**, 2469–2481.
- Bhat, P., Subramanian, K. and Brandenburg, A., A unified large/small-scale dynamo in helical turbulence. *Month. Not. Roy. Astron. Soc.*, 2016b, **461**, 240–247.
- Bhat, P., Saturation of large-scale dynamo in anisotropically forced turbulence. *Month. Not. Roy. Astron. Soc.*, 2021.
- Bhat, P., Saturation of large-scale dynamo in anisotropically forced turbulence. *Month. Not. Roy. Astron. Soc.*, 2022, **509**, 2249–2257.
- Bhat, P., Subramanian, K. and Brandenburg, A., Efficient quasi-kinematic large-scale dynamo as the small-scale dynamo saturates, 2019, arXiv:1905.08278.
- Bhat, P., Zhou, M. and Loureiro, N.F., Inverse energy transfer in decaying, three-dimensional, non-helical magnetic turbulence due to magnetic reconnection. *Month. Not. Roy. Astron. Soc.*, 2021, **501**, 3074–3087.
- Bhatia, B. and De, A., Numerical Study of Trailing and Leading Vortex Dynamics in a Forced Jet with Coflow. *arXiv e-prints*, 2021, arXiv:2101.08749.
- Bhatnagar, A., Statistics of relative velocity for particles settling under gravity in a turbulent flow. *Phys. Rev. E*, 2020, **101**, 033102.
- Bhatnagar, A., Gustavsson, K., Mehlig, B. and Mitra, D., Relative velocities in bidisperse turbulent aerosols: Simulations and theory. *Phys. Rev. E*, 2018a, **98**, 063107.
- Bhatnagar, A., Gustavsson, K. and Mitra, D., Statistics of the relative velocity of particles in turbulent flows: Monodisperse particles. *Phys. Rev. E*, 2018b, **97**, 023105.
- Bhatnagar, A., Pandey, V., Perlekar, P. and Mitra, D., Rate of formation of caustics in heavy particles advected by turbulence, 2021, arXiv:2110.02568.

- Bhatnagar, A., Pandey, V., Perlekar, P. and Mitra, D., Rate of formation of caustics in heavy particles advected by turbulence. *Phil. Trans. Roy. Soc. Lond. Ser. A*, 2022, **380**, 20210086.
- Bingert, S. and Peter, H., Intermittent heating in the solar corona employing a 3D MHD model. *Astron. Astrophys.*, 2011, **530**, A112.
- Bingert, S. and Peter, H., Nanoflare statistics in an active region 3D MHD coronal model. *Astron. Astrophys.*, 2013, **550**, A30.
- Bingert, S., Zacharias, P., Peter, H. and Gudiksen, B.V., On the nature of coronal loops above the quiet sun network. *Adv. Space Res.*, 2010, **45**, 310–313.
- Bonanno, A., Brandenburg, A., Del Sordo, F. and Mitra, D., Breakdown of chiral symmetry during saturation of the Tayler instability. *Phys. Rev. E*, 2012, **86**, 016313.
- Børve, S., Speith, R. and Trulsen, J., Numerical Dissipation in RSPH Simulations of Astrophysical Flows with Application to Protoplanetary Disks. *Astrophys. J.*, 2009, **701**, 1269–1282.
- Bourdin, P.A., Standard 1D solar atmosphere as initial condition for MHD simulations and switch-on effects. *Central Europ. Astrophys. Bull.*, 2014, **38**, 1–10.
- Bourdin, P.A., Bingert, S. and Peter, H., Observationally driven 3D magnetohydrodynamics model of the solar corona above an active region. *Astron. Astrophys.*, 2013a, **555**, A123.
- Bourdin, P.A., Bingert, S. and Peter, H., VizieR Online Data Catalog: 3D-MHD model of a solar active region corona. *VizieR Online Data Catalog*, 2013b, **355**.
- Bourdin, P.A., Bingert, S. and Peter, H., Scaling laws of coronal loops compared to a 3D MHD model of an active region. *Astron. Astrophys.*, 2016, **589**, A86.
- Bourdin, P.A., Plasma Beta Stratification in the Solar Atmosphere: A Possible Explanation for the Penumbra Formation. *Astrophys. J. Lett.*, 2017, **850**, L29.
- Bourdin, P.A., Bingert, S. and Peter, H., Coronal energy input and dissipation in a solar active region 3D MHD model. *Astron. Astrophys.*, 2015, **580**, A72.
- Bourdin, P., Singh, N.K. and Brandenburg, A., Magnetic Helicity Reversal in the Corona at Small Plasma Beta. *Astrophys. J.*, 2018, **869**, 2.
- Bourdin, P.A., Driving solar coronal MHD simulations on high-performance computers. *Geophys. Astrophys. Fluid Dynam.*, 2020, **114**, 235–260.
- Bourdin, P.A., Bingert, S. and Peter, H., Coronal loops above an active region: Observation versus model. *Pub. Astron. Soc. Japan*, 2014, **66**, S7.
- Bourdin, P.A. and Brandenburg, A., Magnetic Helicity from Multipolar Regions on the Solar Surface. *Astrophys. J.*, 2018, **869**, 3.
- Brandenburg, A., Computational aspects of astrophysical MHD and turbulence; in *Advances in Nonlinear Dynamos. Series: The Fluid Mechanics of Astrophysics and Geophysics*, edited by A. Ferriz-Mas and M. Núñez, ISBN: 978-0-415-28788-3. CRC Press, Apr., 2003, pp. 269–344.
- Brandenburg, A., Distributed versus tachocline dynamos; in *Solar activity: exploration, understanding and prediction*, edited by H. Lundstedt, ESA, ESTEC Noordwijk, The Netherlands, Dec., 2005a.
- Brandenburg, A., Importance of Magnetic Helicity in Dynamos; in *Cosmic Magnetic Fields*, edited by R. Wielebinski and R. Beck, Vol. 664 of *Lecture Notes in Physics*, Berlin Springer Verlag, 2005b, p. 219.
- Brandenburg, A., The Case for a Distributed Solar Dynamo Shaped by Near-Surface Shear. *Astrophys. J.*, 2005c, **625**, 539–547.
- Brandenburg, A., Turbulence and its parameterization in accretion discs. *Astron. Nachr.*, 2005d, **326**, 787–797.
- Brandenburg, A., Location of the Solar Dynamo and Near-Surface Shear; in *Solar MHD Theory and Observations: A High Spatial Resolution Perspective*, edited by J. Leibacher, R.F. Stein and H. Uitenbroek, Vol. 354 of *Astron. Soc. Pac. Conf. Ser.*, Dec., 2006a, p. 121.
- Brandenburg, A., Magnetic helicity in primordial and dynamo scenarios of galaxies. *Astron. Nachr.*, 2006b, **327**, 461.
- Brandenburg, A., Why coronal mass ejections are necessary for the dynamo; in *IAU Joint Discussion*, Vol. 8 of *IAU Joint Discussion*, Aug., 2006c.
- Brandenburg, A., Near-surface shear layer dynamics; in *IAU Symp.*, edited by F. Kupka, I. Roxburgh and K.L. Chan, Vol. 239 of *IAU Symp.*, May, 2007a, pp. 457–466.
- Brandenburg, A., Why coronal mass ejections are necessary for the dynamo. *Highlights Astron.*, 2007b, **14**, 291–292.
- Brandenburg, A., The dual role of shear in large-scale dynamos. *Astron. Nachr.*, 2008a, **329**, 725.
- Brandenburg, A., Turbulent protostellar discs. *Phys. Scripta Vol. T*, 2008b, **130**, 014016.
- Brandenburg, A., Advances in Theory and Simulations of Large-Scale Dynamos. *Space Sci. Ref.*, 2009a, **144**, 87–104.
- Brandenburg, A., Advances in Theory and Simulations of Large-Scale Dynamos; in *The Origin and Dynamics of Solar Magnetism, Space Sciences Series of ISSI, Volume 32. ISBN 978-1-4419-0238-2. Springer New York, 2009, p. 87*, edited by M.J. Thompson, A. Balogh, J.L. Culhane, Å. Nordlund, S.K. Solanki and J.P. Zahn, Springer New York, 2009b, p. 87.
- Brandenburg, A., From Fibril to Diffuse Fields During Dynamo Saturation; in *Solar-Stellar Dynamos as Revealed by Helio- and Asteroseismology: GONG 2008/SOHO 21*, edited by M. Dikpati, T. Arntoft, I. González Hernández, C. Lindsey and F. Hill, Vol. 416 of *Astron. Soc. Pac. Conf. Ser.*, Dec., 2009c, p. 433.

- Brandenburg, A., Large-scale Dynamos at Low Magnetic Prandtl Numbers. *Astrophys. J.*, 2009d, **697**, 1206–1213.
- Brandenburg, A., Paradigm shifts in solar dynamo modeling; in *IAU Symp.*, edited by K.G. Strassmeier, A.G. Kosovichev and J.E. Beckman, Vol. 259 of *IAU Symp.*, Apr., 2009e, pp. 159–166.
- Brandenburg, A., The critical role of magnetic helicity in astrophysical large-scale dynamos. *Plasma Phys. Contr. Fusion*, 2009f, **51**, 124043.
- Brandenburg, A., Magnetic field evolution in simulations with Euler potentials. *Month. Not. Roy. Astron. Soc.*, 2010a, **401**, 347–354.
- Brandenburg, A., Surface appearance of dynamo-generated large-scale fields; in *38th COSPAR Scientific Assembly*, Vol. 38 of *COSPAR Meeting*, 2010b, p. 2826.
- Brandenburg, A., Chandrasekhar-Kendall functions in astrophysical dynamos. *Pramana*, 2011a, **77**, 67–76.
- Brandenburg, A., Dissipation in dynamos at low and high magnetic Prandtl numbers. *Astron. Nachr.*, 2011b, **332**, 51.
- Brandenburg, A., Nonlinear Small-scale Dynamos at Low Magnetic Prandtl Numbers. *Astrophys. J.*, 2011c, **741**, 92.
- Brandenburg, A., Simulations of astrophysical dynamos; in *IAU Symp.*, edited by A. Bonanno, E. de Gouveia Dal Pino and A.G. Kosovichev, Vol. 274 of *IAU Symp.*, Jun., 2011d, pp. 402–409.
- Brandenburg, A., Non-linear and chaotic dynamo regimes; in *IAU Symp.*, edited by A.G. Kosovichev, E. de Gouveia Dal Pino and Y. Yan, Vol. 294 of *IAU Symp.*, Jul., 2013, pp. 387–398.
- Brandenburg, A., Magnetic Prandtl Number Dependence of the Kinetic-to-magnetic Dissipation Ratio. *Astrophys. J.*, 2014, **791**, 12.
- Brandenburg, A. and Blackman, E.G., Ejection of Bi-Helical Fields from the Sun. *Highlights Astron.*, 2005, **13**, 101.
- Brandenburg, A., Candelaresi, S. and Chatterjee, P., Small-scale magnetic helicity losses from a mean-field dynamo. *Month. Not. Roy. Astron. Soc.*, 2009a, **398**, 1414–1422.
- Brandenburg, A., Candelaresi, S. and Gent, F.A., Introduction to The Physics and Algorithms of the Pencil Code. *Geophys. Astrophys. Fluid Dynam.*, 2020a, **114**, 1–7.
- Brandenburg, A. and Chatterjee, P., Strong nonlocality variations in a spherical mean-field dynamo. *Astronomische Nachrichten*, 2018, **339**, 118–126.
- Brandenburg, A., Chatterjee, P., Del Sordo, F., Hubbard, A., Käpylä, P.J. and Rheinhardt, M., Turbulent transport in hydromagnetic flows. *Phys. Scripta Vol. T*, 2010a, **142**, 014028.
- Brandenburg, A. and Del Sordo, F., Turbulent diffusion and galactic magnetism. *Highlights Astron.*, 2010, **15**, 432–433.
- Brandenburg, A. and Dintrans, B., Nonaxisymmetric stability in the shearing sheet approximation. *Astron. Astrophys.*, 2006, **450**, 437–444.
- Brandenburg, A., Dintrans, B. and Haugen, N.E.L., Shearing and embedding box simulations of the magnetorotational instability; in *MHD Couette Flows: Experiments and Models*, edited by R. Rosner, G. Rüdiger and A. Bonanno, Vol. 733 of *American Institute of Physics Conference Series*, Nov., 2004a, pp. 122–136.
- Brandenburg, A. and Dobler, W., Pencil Code: Finite-difference Code for Compressible Hydrodynamic Flows, Astrophysics Source Code Library 2010.
- Brandenburg, A., Gressel, O., Jabbari, S., Kleeorin, N. and Rogachevskii, I., Mean-field and direct numerical simulations of magnetic flux concentrations from vertical field. *Astron. Astrophys.*, 2014, **562**, A53.
- Brandenburg, A., Gressel, O., Käpylä, P.J., Kleeorin, N., Mantere, M.J. and Rogachevskii, I., New scaling for the alpha effect in slowly rotating turbulence. *Astrophys. J.*, 2013a, **762**, 127.
- Brandenburg, A. and Guerrero, G., Cycles and cycle modulations; in *IAU Symp.*, edited by C.H. Mandrini and D.F. Webb, Vol. 286 of *IAU Symp.*, Jul., 2012, pp. 37–48.
- Brandenburg, A., Haugen, N. and Mee, A., Nonhelical turbulent dynamos: shocks and shears; in *The Magnetized Plasma in Galaxy Evolution*, edited by K.T. Chyzy, K. Otmianowska-Mazur, M. Soida and R.J. Dettmar, Jun., 2005a, pp. 139–146.
- Brandenburg, A., Haugen, N.E.L. and Babkovskaia, N., Turbulent front speed in the Fisher equation: Dependence on Damköhler number. *Phys. Rev. E*, 2011a, **83**, 016304.
- Brandenburg, A., Haugen, N.E.L. and Dobler, W., MHD simulations of small and large scale dynamos; in *Turbulence, Waves, and Instabilities in the Solar Plasma*, ed. R. Erdélyi, K. Petrovay, B. Roberts, & M. Aschwanden, edited by R. Erdélyi, K. Petrovay, B. Roberts and M. Aschwanden, Kluwer Acad. Publ., Dordrecht, Mar., 2003, pp. 33–53.
- Brandenburg, A., Haugen, N.E.L., Käpylä, P.J. and Sandin, C., The problem of small and large scale fields in the solar dynamo. *Astron. Nachr.*, 2005b, **326**, 174–185.
- Brandenburg, A., Haugen, N.E.L., Li, X.Y. and Subramanian, K., Varying the forcing scale in low Prandtl number dynamos. *Month. Not. Roy. Astron. Soc.*, 2018a, **479**, 2827–2833.
- Brandenburg, A. and Hubbard, P. J., A.K., Dynamical quenching with non-local  $\alpha$  and downward pumping. *Astron. Nachr.*, 2015, **336**, 91–96.
- Brandenburg, A. and Kahniashvili, T., Classes of Hydrodynamic and Magnetohydrodynamic Turbulent Decay. *Phys. Rev. Lett.*, 2017, **118**, 055102.
- Brandenburg, A., Kahniashvili, T. and Tevzadze, A.G., Nonhelical Inverse Transfer of a Decaying Turbulent Magnetic Field. *Phys. Rev. Lett.*, 2015, **114**, 075001.

- Brandenburg, A., Käpylä, P. and Mohammed, A., Passive scalar diffusion as a damped wave; in *Progress in Turbulence*, edited by J. Peinke, A. Kittel, S. Barth and M. Oberlack, Springer-Verlag, Apr., 2005c, pp. 3–6.
- Brandenburg, A. and Käpylä, P.J., Connection between active longitudes and magnetic helicity. *astro-ph/0512639*, 2005.
- Brandenburg, A. and Käpylä, P.J., Magnetic helicity effects in astrophysical and laboratory dynamos. *New J. Phys.*, 2007, **9**, 305.
- Brandenburg, A., Käpylä, P.J. and Korpi, M.J., From convective to stellar dynamos; in *IAU Symp.*, edited by N.H. Brummell, A.S. Brun, M.S. Miesch and Y. Ponty, Vol. 271 of *IAU Symp.*, Aug., 2011b, pp. 279–287.
- Brandenburg, A., Käpylä, P.J., Mitra, D., Moss, D. and Tavakol, R., The helicity constraint in spherical shell dynamos. *Astron. Nachr.*, 2007a, **328**, 1118.
- Brandenburg, A., Käpylä, P.J. and Mohammed, A., Non-Fickian diffusion and tau approximation from numerical turbulence. *Phys. Fluids*, 2004b, **16**, 1020–1027.
- Brandenburg, A., Kemel, K., Kleorin, N., Mitra, D. and Rogachevskii, I., Detection of Negative Effective Magnetic Pressure Instability in Turbulence Simulations. *Astrophys. J. Lett.*, 2011c, **740**, L50.
- Brandenburg, A., Kemel, K., Kleorin, N. and Rogachevskii, I., The Negative Effective Magnetic Pressure in Stratified Forced Turbulence. *Astrophys. J.*, 2012a, **749**, L79.
- Brandenburg, A., Kleorin, N. and Rogachevskii, I., Large-scale magnetic flux concentrations from turbulent stresses. *Astron. Nachr.*, 2010b, **331**, 5.
- Brandenburg, A., Kleorin, N. and Rogachevskii, I., Self-assembly of Shallow Magnetic Spots through Strongly Stratified Turbulence. *Astrophys. J. Lett.*, 2013b, **776**, L23.
- Brandenburg, A., Korpi, M.J. and Mee, A.J., Thermal Instability in Shearing and Periodic Turbulence. *Astrophys. J.*, 2007b, **654**, 945–954.
- Brandenburg, A. and Lazarian, A., Astrophysical Hydromagnetic Turbulence. *Space Sci. Ref.*, 2013, **178**, 163–200.
- Brandenburg, A. and Matthaeus, W.H., Magnetic helicity evolution in a periodic domain with imposed field. *Phys. Rev. E*, 2004, **69**, 056407.
- Brandenburg, A. and Multamäki, T., How long can left and right handed life forms coexist?. *Int. J. Astrobiology*, 2004, **3**, 209–219.
- Brandenburg, A. and Nordlund, Å., Astrophysical turbulence modeling. *Rep. Progr. Phys.*, 2011, **74**, 046901.
- Brandenburg, A. and Oughton, S., Cross-helicity forced and decaying hydromagnetic turbulence. *Astronomische Nachrichten*, 2018, **339**, 641–646.
- Brandenburg, A., Petrie, G.J.D. and Singh, N.K., Two-scale Analysis of Solar Magnetic Helicity. *Astrophys. J.*, 2017a, **836**, 21.
- Brandenburg, A. and Petrosyan, A., Kinetic helicity decay in linearly forced turbulence. *Astron. Nachr.*, 2012, **333**, 195.
- Brandenburg, A. and Rädler, K.H., Yoshizawa’s cross-helicity effect and its quenching. *Geophys. Astrophys. Fluid Dynam.*, 2013, **107**, 207–217.
- Brandenburg, A., Rädler, K.H. and Kemel, K., Mean-field transport in stratified and/or rotating turbulence. *Astron. Astrophys.*, 2012b, **539**, A35.
- Brandenburg, A., Rädler, K.H. and Kemel, K., Mean-field transport in stratified and/or rotating turbulence (Corrigendum). *Astron. Astrophys.*, 2012c, **545**, C1.
- Brandenburg, A., Rädler, K.H., Rheinhardt, M. and Käpylä, P.J., Magnetic Diffusivity Tensor and Dynamo Effects in Rotating and Shearing Turbulence. *Astrophys. J.*, 2008a, **676**, 740–751.
- Brandenburg, A., Rädler, K.H., Rheinhardt, M. and Subramanian, K., Magnetic Quenching of  $\alpha$  and Diffusivity Tensors in Helical Turbulence. *Astrophys. J. Lett.*, 2008b, **687**, L49–L52.
- Brandenburg, A., Rädler, K.H. and Schinner, M., Scale dependence of alpha effect and turbulent diffusivity. *Astron. Astrophys.*, 2008c, **482**, 739–746.
- Brandenburg, A. and Rüdiger, G., The angular momentum transport by the strato-rotational instability in simulated Taylor-Couette flows. *astro-ph/0512409*, 2005.
- Brandenburg, A. and Sandin, C., Catastrophic alpha quenching alleviated by helicity flux and shear. *Astron. Astrophys.*, 2004, **427**, 13–21.
- Brandenburg, A., Sandin, C. and Käpylä, P.J., Helical coronal ejections and their role in the solar cycle; in *Multi-Wavelength Investigations of Solar Activity*, edited by A.V. Stepanov, E.E. Benevolenskaya and A.G. Kosovichev, Vol. 223 of *IAU Symp.*, 2004c, pp. 57–64.
- Brandenburg, A., Schober, J. and Rogachevskii, I., The contribution of kinetic helicity to turbulent magnetic diffusivity. *Astronomische Nachrichten*, 2017b, **338**, 790–793.
- Brandenburg, A., Sokoloff, D. and Subramanian, K., Current Status of Turbulent Dynamo Theory. From Large-Scale to Small-Scale Dynamos. *Space Sci. Ref.*, 2012d, **169**, 123–157.
- Brandenburg, A. and Stepanov, R., Faraday Signature of Magnetic Helicity from Reduced Depolarization. *Astrophys. J.*, 2014, **786**, 91.
- Brandenburg, A. and Subramanian, K., Astrophysical magnetic fields and nonlinear dynamo theory. *Phys. Rep.*, 2005a, **417**, 1–209.
- Brandenburg, A. and Subramanian, K., Minimal tau approximation and simulations of the alpha effect. *Astron. Astrophys.*, 2005b, **439**, 835–843.
- Brandenburg, A. and Subramanian, K., Strong mean field dynamos require supercritical helicity fluxes. *Astron. Nachr.*, 2005c, **326**, 400–408.

- Brandenburg, A. and Subramanian, K., Simulations of the anisotropic kinetic and magnetic alpha effects. *Astron. Nachr.*, 2007, **328**, 507.
- Brandenburg, A., Svedin, A. and Vasil, G.M., Turbulent diffusion with rotation or magnetic fields. *Month. Not. Roy. Astron. Soc.*, 2009b, **395**, 1599–1606.
- Brandenburg, A., Advances in mean-field dynamo theory and applications to astrophysical turbulence. *J. Plasma Phys.*, 2018, **84**, 735840404.
- Brandenburg, A., Ambipolar diffusion in large Prandtl number turbulence. *Month. Not. Roy. Astron. Soc.*, 2019a, **487**, 2673–2684.
- Brandenburg, A., The Limited Roles of Autocatalysis and Enantiomeric Cross-Inhibition in Achieving Homochirality in Dilute Systems. *Origins of Life and Evolution of the Biosphere*, 2019b, **49**, 49–60.
- Brandenburg, A., Hall cascade with fractional magnetic helicity in neutron star crusts. *Astrophys. J.*, 2020a, **901**, 18.
- Brandenburg, A., Piecewise quadratic growth during the 2019 novel coronavirus epidemic. *Infectious Disease Modelling*, 2020b, **5**, 681–690.
- Brandenburg, A., Scientific usage of the Pencil Code., 2020c, DOI:10.5281/zenodo.3466444.
- Brandenburg, A., Hosking integral in non-helical Hall cascade. *J. Plasma Phys.*, 2023a, **89**, 175890101.
- Brandenburg, A., Quadratic growth during the COVID-19 pandemic: merging hotspots and reinfections. *J. Phys. A Math.*, 2023b, **56**, 044002.
- Brandenburg, A., Ashurova, M.B. and Jabbari, S., Compensating Faraday Depolarization by Magnetic Helicity in the Solar Corona. *Astrophys. J.*, 2017c, **845**, L15.
- Brandenburg, A. and Boldyrev, S., The Turbulent Stress Spectrum in the Inertial and Subinertial Ranges. *Astrophys. J.*, 2020, **892**, 80.
- Brandenburg, A., Bracco, A., Kahniashvili, T., Mandal, S., Roper Pol, A., Petrie, G.J.D. and Singh, N.K., E and B Polarizations from Inhomogeneous and Solar Surface Turbulence. *Astrophys. J.*, 2019a, **870**, 87.
- Brandenburg, A. and Brüggén, M., Hemispheric Handedness in the Galactic Synchrotron Polarization Foreground. *Astrophys. J. Lett.*, 2020, **896**, L14.
- Brandenburg, A. and Chen, L., The nature of mean-field generation in three classes of optimal dynamos. *J. Plasma Phys.*, 2020, **86**, 905860110.
- Brandenburg, A., Clarke, E., He, Y. and Kahniashvili, T., Can we observe the QCD phase transition-generated gravitational waves through pulsar timing arrays?. *Phys. Rev. D*, 2021a, **104**, 043513.
- Brandenburg, A. and Das, U., The time step constraint in radiation hydrodynamics. *Geophys. Astrophys. Fluid Dynam.*, 2020, **114**, 162–195.
- Brandenburg, A. and Das, U., Turbulent radiative diffusion and turbulent Newtonian cooling. *Phys. Fluids*, 2021, **33**, 095125.
- Brandenburg, A., Durrer, R., Huang, Y., Kahniashvili, T., Mandal, S. and Mukohyama, S., Primordial magnetic helicity evolution with a homogeneous magnetic field from inflation. *Phys. Rev. D*, 2020b, **102**, 023536.
- Brandenburg, A., Durrer, R., Kahniashvili, T., Mandal, S. and Yin, W.W., Statistical properties of scale-invariant helical magnetic fields and applications to cosmology. *J. Cosmol. Astropart. Phys.*, 2018b, **2018**, 034.
- Brandenburg, A. and Furuya, R.S., Application of a helicity proxy to edge-on galaxies. *Month. Not. Roy. Astron. Soc.*, 2020, **496**, 4749–4759.
- Brandenburg, A., Gogoberidze, G., Kahniashvili, T., Mandal, S., Pol, A.R. and Shenoy, N., The scalar, vector, and tensor modes in gravitational wave turbulence simulations. *Class. Quantum Grav.*, 2021b, **38**, 145002.
- Brandenburg, A., He, Y., Kahniashvili, T., Rheinhardt, M. and Schober, J., Relic Gravitational Waves from the Chiral Magnetic Effect. *Astrophys. J.*, 2021c, **911**, 110.
- Brandenburg, A., He, Y. and Sharma, R., Simulations of Helical Inflationary Magnetogenesis and Gravitational Waves. *Astrophys. J.*, 2021d, **922**, 192.
- Brandenburg, A., Kahniashvili, T., Mandal, S., Pol, A.R., Tevzadze, A.G. and Vachaspati, T., Evolution of hydromagnetic turbulence from the electroweak phase transition. *Phys. Rev. D*, 2017d, **96**, 123528.
- Brandenburg, A., Kahniashvili, T., Mandal, S., Pol, A.R., Tevzadze, A.G. and Vachaspati, T., Dynamo effect in decaying helical turbulence. *Phys. Rev. Fluids*, 2019b, **4**, 024608.
- Brandenburg, A., Kamada, K. and Schober, J., Decay law of magnetic turbulence with helicity balanced by chiral fermions. *arXiv e-prints*, 2023a, arXiv:2302.00512.
- Brandenburg, A. and Ntormousi, E., Dynamo effect in unstirred self-gravitating turbulence. *Month. Not. Roy. Astron. Soc.*, 2022, **513**, 2136–2151.
- Brandenburg, A. and Rempel, M., Reversed Dynamo at Small Scales and Large Magnetic Prandtl Number. *Astrophys. J.*, 2019, **879**, 57.
- Brandenburg, A., Rogachevskii, I. and Schober, J., Dissipative magnetic structures and scales in small-scale dynamos. *Month. Not. Roy. Astron. Soc.*, 2023b, **518**, 6367–6375.
- Brandenburg, A. and Scannapieco, E., Magnetic Helicity Dissipation and Production in an Ideal MHD Code. *Astrophys. J.*, 2020, **889**, 55.
- Brandenburg, A., Schober, J., Rogachevskii, I., Kahniashvili, T., Boyarsky, A., Fröhlich, J., Ruchayskiy, O. and Kleeorin, N., The Turbulent Chiral Magnetic Cascade in the Early Universe. *Astrophys. J.*, 2017e, **845**, L21.



- Brandenburg, A. and Sharma, R., Simulating Relic Gravitational Waves from Inflationary Magnetogenesis. *Astrophys. J.*, 2021, **920**, 26.
- Brandenburg, A., Zhou, H. and Sharma, R., Batchelor, Saffman, and Kazantsev spectra in galactic small-scale dynamos. *Month. Not. Roy. Astron. Soc.*, 2023c, **518**, 3312–3325.
- Brun, A.S., García, R.A., Houdek, G., Nandy, D. and Pinsonneault, M., The Solar-Stellar Connection. *Space Sci. Ref.*, 2015, **196**, 303–356.
- Brun, A.S. and Browning, M.K., Magnetism, dynamo action and the solar-stellar connection. *Living Reviews in Solar Physics*, 2017, **14**, 4.
- Bushby, P.J., Käpylä, P.J., Masada, Y., Brandenburg, A., Favier, B., Guervilly, C. and Käpylä, M.J., Large-scale dynamos in rapidly rotating plane layer convection. *Astron. Astrophys.*, 2018, **612**, A97.
- Bykov, A.M., Brandenburg, A., Malkov, M.A. and Osipov, S.M., Microphysics of Cosmic Ray Driven Plasma Instabilities. *Space Sci. Ref.*, 2013, **178**, 201–232.
- Cabezón, R.M., García-Senz, D. and Figueira, J., SPHYNX: an accurate density-based SPH method for astrophysical applications. *Astron. Astrophys.*, 2017, **606**, A78.
- Caldwell, R., Cui, Y., Guo, H.K., Mandic, V., Mariotti, A., No, J.M., Ramsey-Musolf, M.J., Sakellariadou, M., Sinha, K., Wang, L.T., White, G., Zhao, Y., An, H., Bian, L., Caprini, C., Clesse, S., Cline, J.M., Cusin, G., Fornal, B., Jinno, R., Laurent, B., Levi, N., Lyu, K.F., Martinez, M., Miller, A.L., Redigolo, D., Scarlata, C., Sevrin, A., Hagi, B.S.E., Shu, J., Siemens, X., Steer, D.A., Sundrum, R., Tamarit, C., Weir, D.J., Xie, K.P., Yang, F.W. and Zhou, S., Detection of early-universe gravitational-wave signatures and fundamental physics. *General Relativity and Gravitation*, 2022, **54**, 156.
- Cameron, R.H., Dikpati, M. and Brandenburg, A., The Global Solar Dynamo. *Space Sci. Ref.*, 2017, **210**, 367–395.
- Candelaresi, S. and Brandenburg, A., Decay of helical and non-helical magnetic knots. *Phys. Rev. E*, 2011a, **84**, 016406.
- Candelaresi, S. and Brandenburg, A., Magnetic helicity fluxes in  $\alpha\Omega$  dynamos; in *IAU Symp.*, edited by A. Bonanno, E. de Gouveia Dal Pino and A.G. Kosovichev, Vol. 274 of *IAU Symp.*, Jun., 2011b, pp. 464–466.
- Candelaresi, S. and Brandenburg, A., Magnetic helicity fluxes and their effect on stellar dynamos; in *IAU Symp.*, edited by C.H. Mandrini and D.F. Webb, Vol. 286 of *IAU Symp.*, Jul., 2012, pp. 49–53.
- Candelaresi, S. and Brandenburg, A., Kinetic helicity needed to drive large-scale dynamos. *Phys. Rev. E*, 2013a, **87**, 043104.
- Candelaresi, S. and Brandenburg, A., Topological constraints on magnetic field relaxation; in *IAU Symp.*, edited by A.G. Kosovichev, E. de Gouveia Dal Pino and Y. Yan, Vol. 294 of *IAU Symp.*, Jul., 2013b, pp. 353–357.
- Candelaresi, S., Del Sordo, F. and Brandenburg, A., Decay of trefoil and other magnetic knots; in *IAU Symp.*, edited by A. Bonanno, E. de Gouveia Dal Pino and A.G. Kosovichev, Vol. 274 of *IAU Symp.*, Jun., 2011a, pp. 461–463.
- Candelaresi, S., Hubbard, A., Brandenburg, A. and Mitra, D., Magnetic helicity transport in the advective gauge family. *Physics of Plasmas*, 2011b, **18**, 012903.
- Candelaresi, S., Pontin, D.I. and Hornig, G., Effects of Field-line Topology on Energy Propagation in the Corona. *Astrophys. J.*, 2016, **832**, 150.
- Candelaresi, S., Sordo, F.D. and Brandenburg, A., Influence of Magnetic Helicity in MHD; in *IAU Symp.*, edited by N.H. Brummell, A.S. Brun, M.S. Miesch and Y. Ponty, Vol. 271 of *IAU Symp.*, Aug., 2011c, pp. 369–370.
- Candelaresi, S. and Del Sordo, F., Stabilizing Effect of Magnetic Helicity on Magnetic Cavities in the Intergalactic Medium. *Astrophys. J.*, 2020, **896**, 86.
- Candelaresi, S. and Del Sordo, F., Stability of plasmas through magnetic helicity. *arXiv e-prints*, 2021, arXiv:2112.01193.
- Candelaresi, S., Hornig, G., Podger, B. and Pontin, D.I., Relaxation of Vortex Braids, 2019, arXiv:1907.11071.
- Cantiello, M., Braithwaite, J., Brandenburg, A., Del Sordo, F., Käpylä, P. and Langer, N., 3D MHD simulations of subsurface convection in OB stars; in *IAU Symp.*, edited by C. Neiner, G. Wade, G. Meynet and G. Peters, Vol. 272 of *IAU Symp.*, Jul., 2011a, pp. 32–37.
- Cantiello, M., Braithwaite, J., Brandenburg, A., Del Sordo, F., Käpylä, P. and Langer, N., Turbulence and magnetic spots at the surface of hot massive stars; in *IAU Symp.*, edited by D. Prasad Choudhary and K.G. Strassmeier, Vol. 273 of *IAU Symp.*, Aug., 2011b, pp. 200–203.
- Carenza, P., Sharma, R., Marsh, M.C.D., Brandenburg, A. and Müller, E., Magnetohydrodynamics predicts heavy-tailed distributions of axion-photon conversion. *arXiv e-prints*, 2022, arXiv:2208.04333.
- Carrera, D., Johansen, A. and Davies, M.B., Formation of asteroids from mm-cm sized grains; in *Search for Life Beyond the Solar System. Exoplanets, Biosignatures & Instruments*, edited by D. Apai and P. Gabor, Mar., 2014, p. P2.13.
- Carrera, D., Johansen, A. and Davies, M.B., How to form planetesimals from mm-sized chondrules and chondrule aggregates. *Astron. Astrophys.*, 2015, **579**, A43.
- Castrejon, A., Lyra, W., Richert, A.J.W. and Kuchner, M., Disentangling Planets from Photoelectric Instability in Gas-rich Optically Thin Dusty Disks. *Astrophys. J.*, 2019, **887**, 6.
- Cavecchi, Y., Watts, A.L., Braithwaite, J. and Levin, Y., Flame propagation on the surfaces of rapidly rotating neutron stars during Type I X-ray bursts. *Month. Not. Roy. Astron. Soc.*, 2013, **434**, 3526–3541.
- Chamandy, L., An analytical dynamo solution for large-scale magnetic fields of galaxies. *Month. Not. Roy. Astron. Soc.*, 2016, **462**, 4402–4415.

- Chamandy, L., Shukurov, A. and Taylor, A.R., Statistical Tests of Galactic Dynamo Theory. *Astrophys. J.*, 2016, **833**, 43.
- Chamandy, L., Subramanian, K. and Shukurov, A., Galactic spiral patterns and dynamo action - I. A new twist on magnetic arms. *Month. Not. Roy. Astron. Soc.*, 2013, **428**, 3569–3589.
- Charbonneau, P., Where is the solar dynamo?. *J. Phys. Conf. Ser.*, 2013, **440**, 012014.
- Charbonneau, P., Solar Dynamo Theory. *Ann. Rev. Astron. Astrophys.*, 2014, **52**, 251–290.
- Chatterjee, P., Alpha effect due to magnetic buoyancy instability of a horizontal magnetic layer; in *Astron. Soc. India Conf. Ser.*, Vol. 2 of *Astron. Soc. India Conf. Ser.*, 2011, pp. 137–142.
- Chatterjee, P., Brandenburg, A. and Guerrero, G., Can catastrophic quenching be alleviated by separating shear and  $\alpha$  effect?. *Geophys. Astrophys. Fluid Dynam.*, 2010, **104**, 591–599.
- Chatterjee, P., Guerrero, G. and Brandenburg, A., Magnetic helicity fluxes in interface and flux transport dynamos. *Astron. Astrophys.*, 2011a, **525**, A5.
- Chatterjee, P., Mitra, D., Brandenburg, A. and Rheinhardt, M., Spontaneous chiral symmetry breaking by hydromagnetic buoyancy. *Phys. Rev. E*, 2011b, **84**, 025403.
- Chatterjee, P., Mitra, D., Rheinhardt, M. and Brandenburg, A., Alpha effect due to buoyancy instability of a magnetic layer. *Astron. Astrophys.*, 2011c, **534**, A46.
- Chatterjee, P., Testing Alfvén wave propagation in a “realistic” set-up of the solar atmosphere. *Geophys. Astrophys. Fluid Dynam.*, 2020, **114**, 213–234.
- Chatterjee, P., Hansteen, V. and Carlsson, M., Modeling Repeatedly Flaring  $\delta$  Sunspots. *Phys. Rev. Lett.*, 2016, **116**, 101101.
- Chaudhuri, S., Pair dispersion of turbulent premixed flame elements. *Phys. Rev. E*, 2015, **91**, 021001.
- Chen, F., Peter, H., Bingert, S. and Cheung, M.C.M., Magnetic jam in the corona of the Sun. *Nature Physics*, 2015, **11**, 492–495.
- Cheung, M.C.M., Boerner, P., Schrijver, C.J., Testa, P., Chen, F., Peter, H. and Malanushenko, A., Thermal Diagnostics with the Atmospheric Imaging Assembly on board the Solar Dynamics Observatory: A Validated Method for Differential Emission Measure Inversions. *Astrophys. J.*, 2015, **807**, 143.
- Chian, A.C.L., Rempel, E.L., Aulanier, G., Schmieder, B., Shaden, S.C., Welsch, B.T. and Yeates, A.R., Detection of Coherent Structures in Photospheric Turbulent Flows. *Astrophys. J.*, 2014, **786**, 51.
- Chouliaras, G. and Gourgouliatos, K.N., Application of an Upwind integration method to plane parallel Hall-MHD. *Astron. Comput.*, 2022, **39**, 100553.
- Christensson, M., Hindmarsh, M. and Brandenburg, A., Scaling laws in decaying helical hydromagnetic turbulence. *Astron. Nachr.*, 2005, **326**, 393–399.
- Cole, E., Brandenburg, A., Käpylä, P.J. and Käpylä, M.J., Robustness of oscillatory  $\alpha^2$  dynamos in spherical wedges. *Astron. Astrophys.*, 2016, **593**, A134.
- Cole, E., Käpylä, P.J., Mantere, M.J. and Brandenburg, A., An Azimuthal Dynamo Wave in Spherical Shell Convection. *Astrophys. J. Lett.*, 2014, **780**, L22.
- Commerçon, B., Lebreuilly, U., Price, D.J., Lovascio, F., Laibe, G. and Hennebelle, P., Dynamics of dust grains in turbulent molecular clouds. Conditions for decoupling and limits of different numerical implementations. *Astron. Astrophys.*, 2023, **671**, A128.
- Currie, T., Lawson, K., Schneider, G., Lyra, W., Wisniewski, J., Grady, C., Guyon, O., Tamura, M., Kotani, T., Kawahara, H., Brandt, T., Uyama, T., Muto, T., Dong, R., Kudo, T., Hashimoto, J., Fukagawa, M., Wagner, K., Lozi, J., Chilcote, J., Tobin, T., Groff, T., Ward-Duong, K., Januszewski, W., Norris, B., Tuthill, P., van der Marel, N., Sitko, M., Deo, V., Vievard, S., Jovanovic, N., Martinache, F. and Skaf, N., Images of embedded Jovian planet formation at a wide separation around AB Aurigae. *Nat. Astron.*, 2022a.
- Currie, T., Lawson, K., Schneider, G., Lyra, W., Wisniewski, J., Grady, C., Guyon, O., Tamura, M., Kotani, T., Kawahara, H., Brandt, T., Uyama, T., Muto, T., Dong, R., Kudo, T., Hashimoto, J., Fukagawa, M., Wagner, K., Lozi, J., Chilcote, J., Tobin, T., Groff, T., Ward-Duong, K., Januszewski, W., Norris, B., Tuthill, P., van der Marel, N., Sitko, M., Deo, V., Vievard, S., Jovanovic, N., Martinache, F. and Skaf, N., Images of Embedded Jovian Planet Formation At A Wide Separation Around AB Aurigae. *arXiv e-prints*, 2022b, arXiv:2204.00633.
- de Val-Borro, M., Edgar, R.G., Artymowicz, P., Ciecielag, P., Cresswell, P., D’Angelo, G., Delgado-Donate, E.J., Dirksen, G., Fromang, S., Gawryszczak, A., Klahr, H., Kley, W., Lyra, W., Masset, F., Mellema, G., Nelson, R.P., Paardekooper, S.J., Peplinski, A., Pierens, A., Plewa, T., Rice, K., Schäfer, C. and Speith, R., A comparative study of disc-planet interaction. *Month. Not. Roy. Astron. Soc.*, 2006, **370**, 529–558.
- Del Sordo, F., Bonanno, A., Brandenburg, A. and Mitra, D., Spontaneous chiral symmetry breaking in the Tayler instability; in *IAU Symp.*, edited by C.H. Mandrini and D.F. Webb, Vol. 286 of *IAU Symp.*, Jul., 2012, pp. 65–69.
- Del Sordo, F. and Brandenburg, A., How can vorticity be produced in irrotationally forced flows?; in *IAU Symp.*, edited by A. Bonanno, E. de Gouveia Dal Pino and A.G. Kosovichev, Vol. 274 of *IAU Symp.*, Jun., 2011a, pp. 373–375.
- Del Sordo, F. and Brandenburg, A., Vorticity production through rotation, shear, and baroclinicity. *Astron. Astrophys.*, 2011b, **528**, A145.
- Del Sordo, F., Candelaresi, S. and Brandenburg, A., Magnetic-field decay of three interlocked flux rings with zero linking number. *Phys. Rev. E*, 2010, **81**, 036401.
- Del Sordo, F., Guerrero, G. and Brandenburg, A., Turbulent dynamos with advective magnetic helicity flux. *Month. Not. Roy. Astron. Soc.*, 2013, **429**, 1686–1694.
- Devlen, E., Brandenburg, A. and Mitra, D., A mean field dynamo from negative eddy diffusivity. *Month. Not. Roy. Astron. Soc.*, 2013, **432**, 1651–1657.

- Di Bernardo, G. and Torkelsson, U., Wave modes from the magnetorotational instability in accretion discs; in *IAU Symp.*, edited by C.M. Zhang, T. Belloni, M. Méndez and S.N. Zhang, Vol. 290 of *IAU Symp.*, Feb., 2013, pp. 201–202.
- Dittrich, K., Klahr, H. and Johansen, A., Gravoturbulent Planetsimal Formation: The Positive Effect of Long-lived Zonal Flows. *Astrophys. J.*, 2013, **763**, 117.
- Dittrich, K., Klahr, H. and Johansen, A., Planetsimal Formation in Zonal Flows Arising in Magneto-Rotationally-Unstable Protoplanetary Disks; in *Formation, Detection, and Characterization of Extrasolar Habitable Planets*, edited by N. Haghighipour, Vol. 293 of *IAU Symp.*, Apr., 2014, pp. 244–249.
- Dobler, W. and Getling, A.V., Compressible magnetoconvection as the local producer of solar-type magnetic structures; in *Multi-Wavelength Investigations of Solar Activity*, edited by A.V. Stepanov, E.E. Benevolenskaya and A.G. Kosovichev, Vol. 223 of *IAU Symp.*, 2004, pp. 239–240.
- Dobler, W., Haugen, N.E., Yousef, T.A. and Brandenburg, A., Bottleneck effect in three-dimensional turbulence simulations. *Phys. Rev. E*, 2003, **68**, 026304.
- Dobler, W., Stix, M. and Brandenburg, A., Magnetic Field Generation in Fully Convective Rotating Spheres. *Astrophys. J.*, 2006, **638**, 336–347.
- Dorch, S.B.F., A Magnetic Betelgeuse? Numerical Simulations of Non-Linear Dynamo Action; in *Stars as Suns : Activity, Evolution and Planets*, edited by A.K. Dupree and A.O. Benz, Vol. 219 of *IAU Symp.*, Jan., 2004a, p. 656.
- Dorch, S.B.F., Magnetic activity in late-type giant stars: Numerical MHD simulations of non-linear dynamo action in Betelgeuse. *Astron. Astrophys.*, 2004b, **423**, 1101–1107.
- Dorch, S.B.F., Dynamo action in late-type giants; in *13th Cambridge Workshop on Cool Stars, Stellar Systems and the Sun*, edited by F. Favata, G.A.J. Hussain and B. Battrick, Vol. 560 of *ESA Special Publication*, Mar., 2005, p. 511.
- Duffell, P.C. and MacFadyen, A.I., High-frequency Voronoi noise reduced by smoothed-mesh motion. *Month. Not. Roy. Astron. Soc.*, 2015, **449**, 2718–2722.
- Emeriau-Viard, C. and Brun, A.S., Origin and Evolution of Magnetic Field in PMS Stars: Influence of Rotation and Structural Changes. *Astrophys. J.*, 2017, **846**, 8.
- Eriksson, L.E.J., Johansen, A. and Liu, B., Pebble drift and planetsimal formation in protoplanetary discs with embedded planets. *Astron. Astrophys.*, 2020, **635**, A110.
- Evirgen, C.C., Gent, F.A., Shukurov, A., Fletcher, A. and Bushby, P.J., The supernova-regulated ISM - VI. Magnetic effects on the structure of the interstellar medium. *Month. Not. Roy. Astron. Soc.*, 2019, **488**, 5065–5074.
- Evirgen, C.C. and Gent, F., MHD supernova explosions – Large-scale magnetic field effects, 2019, arXiv:1908.08781.
- Félix, S., Audit, E. and Dintrans, B., Pulsations-convection combination in stars; in *SF2A-2012: Proc. Annual Meeting French Soc. Astron. Astrophys.*, edited by S. Boissier, P. de Laverny, N. Nardetto, R. Samadi, D. Valls-Gabaud and H. Wozniak, Dec., 2012, pp. 329–332.
- Félix, S., Audit, E. and Dintrans, B., Towards 3D simulations of Cepheids stars; in *SF2A-2013: Proceedings of the Annual meeting of the French Society of Astronomy and Astrophysics*, edited by L. Cambresy, F. Martins, E. Nuss and A. Palacios, Nov., 2013, pp. 223–226.
- Flock, M., Dzyurkevich, N., Klahr, H., Turner, N.J. and Henning, T., Turbulence and Steady Flows in Three-dimensional Global Stratified Magnetohydrodynamic Simulations of Accretion Disks. *Astrophys. J.*, 2011, **735**, 122.
- Freytag, B., Steffen, M., Ludwig, H.G., Wedemeyer-Böhm, S., Schaffenberger, W. and Steiner, O., Simulations of stellar convection with CO5BOLD. *J. Comp. Phys.*, 2012, **231**, 919–959.
- Fromang, S., MRI-driven angular momentum transport in protoplanetary disks; in *EAS Publications Series*, Vol. 62 of *EAS Publications Series*, Sep., 2013, pp. 95–142.
- Fromang, S., Hennebelle, P. and Teyssier, R., A high order Godunov scheme with constrained transport and adaptive mesh refinement for astrophysical magnetohydrodynamics. *Astron. Astrophys.*, 2006, **457**, 371–384.
- Fromang, S., Lyra, W. and Masset, F., Meridional circulation in turbulent protoplanetary disks. *Astron. Astrophys.*, 2011, **534**, A107.
- Fromang, S. and Papaloizou, J., MHD simulations of the magnetorotational instability in a shearing box with zero net flux. I. The issue of convergence. *Astron. Astrophys.*, 2007, **476**, 1113–1122.
- Fromang, S., Papaloizou, J., Lesur, G. and Heinemann, T., MHD simulations of the magnetorotational instability in a shearing box with zero net flux. II. The effect of transport coefficients. *Astron. Astrophys.*, 2007, **476**, 1123–1132.
- Fromang, S., Papaloizou, J., Lesur, G. and Heinemann, T., Numerical Simulations of MHD Turbulence in Accretion Disks; in *Numerical Modeling of Space Plasma Flows: ASTRONUM-2008*, edited by N.V. Pogorelov, E. Audit, P. Colella and G.P. Zank, Vol. 406 of *Astron. Soc. Pac. Conf. Ser.*, Apr., 2009, p. 9.
- Fromang, S., Papaloizou, J., Lesur, G. and Heinemann, T., MHD turbulence in accretion disks: the importance of the magnetic Prandtl number; in *EAS Publications Series*, edited by T. Montmerle, D. Ehrenreich and A.M. Lagrange, Vol. 41 of *EAS Publications Series*, Jan., 2010, pp. 167–170.
- Gabbasov, R.F., Klapp-Escribano, J., Suarez-Cansino, J. and Sigalotti, L.D.G., Numerical simulations of the Kelvin-Helmholtz instability with the Gadget-2 SPH code. *arXiv:1310.3859*, 2013.
- Gaburov, E., Johansen, A. and Levin, Y., Magnetically Levitating Accretion Disks around Supermassive Black Holes. *Astrophys. J.*, 2012, **758**, 103.

- Garcia de Andrade, L., Magnetic field reversals and topological entropy in non-geodesic hyperbolic dynamos. *arXiv:0911.0218*, 2009.
- Gastine, T. and Dintrans, B., Direct numerical simulations of the  $\kappa$ -mechanism. I. Radial modes in the purely radiative case. *Astron. Astrophys.*, 2008a, **484**, 29–42.
- Gastine, T. and Dintrans, B., Direct numerical simulations of the  $\kappa$ -mechanism. II. Nonlinear saturation and the Hertzsprung progression. *Astron. Astrophys.*, 2008b, **490**, 743–752.
- Gastine, T. and Dintrans, B., DNS of the kappa-mechanism. *arXiv:0809.4949*, 2008c.
- Gastine, T. and Dintrans, B., Numerical simulations of the  $\kappa$ -mechanism with convection. *Astrophys. Space Sci.*, 2010, **328**, 245–251.
- Gastine, T. and Dintrans, B., A test of time-dependent theories of stellar convection. *Astron. Astrophys.*, 2011a, **530**, L7.
- Gastine, T. and Dintrans, B., Convective quenching of stellar pulsations. *Astron. Astrophys.*, 2011b, **528**, A6.
- Gastine, T. and Dintrans, B., Nonlinear simulations of the convection-pulsation coupling; in *SF2A-2012: Proc. Annual Meeting French Soc. Astron. Astrophys.*, edited by G. Alecian, K. Belkacem, R. Samadi and D. Valls-Gabaud, Dec., 2011c, pp. 215–219.
- Gellert, M., Rüdiger, G. and Elstner, D., Helicity generation and  $\alpha$ -effect by Tayler instability with z-dependent differential rotation. *Astron. Astrophys.*, 2008, **479**, L33–L36.
- Gent, F.A., Supernovae driven turbulence in the interstellar medium. Ph.D. Thesis, Newcastle University, 2012.
- Gent, F.A., Käpylä, M.J. and Warnecke, J., Long-term variations of turbulent transport coefficients in a solarlike convective dynamo simulation. *Astronomische Nachrichten*, 2017, **338**, 885–895.
- Gent, F.A., Mac Low, M.M., Käpylä, M.J., Sarson, G.R. and Hollins, J.F., Modelling supernova-driven turbulence. *Geophys. Astrophys. Fluid Dynam.*, 2020, **114**, 77–105.
- Gent, F.A., Shukurov, A., Fletcher, A., Sarson, G.R. and Mantere, M.J., The supernova-regulated ISM - I. The multiphase structure. *Month. Not. Roy. Astron. Soc.*, 2013a, **432**, 1396–1423.
- Gent, F.A., Shukurov, A., Sarson, G.R., Fletcher, A. and Mantere, M.J., The supernova-regulated ISM - II. The mean magnetic field. *Month. Not. Roy. Astron. Soc.*, 2013b, **430**, L40–L44.
- Gent, F.A., Mac Low, M.M., Käpylä, M.J. and Singh, N.K., Small-scale Dynamo in Supernova-driven Interstellar Turbulence. *Astrophys. J. Lett.*, 2021, **910**, L15.
- Gent, F.A., Mac Low, M.M., Korpi-Lagg, M.J. and Singh, N.K., The small-scale dynamo in a multiphase supernova-driven medium. *arXiv e-prints*, 2022, arXiv:2210.04460.
- Gent, F.A., Mac Low, M.M., Korpi-Lagg, M.J. and Singh, N.K., The Small-scale Dynamo in a Multiphase Supernova-driven Medium. *Astrophys. J.*, 2023, **943**, 176.
- Gerbig, K., Murray-Clay, R. and Klahr, H., How scales of streaming and Kelvin-Helmholtz instabilities regulate particle overdensities in protoplanetary disks; in *AAS/Division for Extreme Solar Systems Abstracts*, Vol. 51 of *AAS/Division for Extreme Solar Systems Abstracts*, Aug, 2019, p. 317.20.
- Gerbig, K., Murray-Clay, R.A., Klahr, H. and Baehr, H., Requirements for Gravitational Collapse in Planetary Formation—The Impact of Scales Set by Kelvin-Helmholtz and Non-linear Streaming Instability. *Astrophys. J.*, 2020, **895**, 91.
- Getling, A.V., The flow helicity in quasi-ordered cellular convection; in *IAU Symp.*, edited by A.G. Kosovichev, E. de Gouveia Dal Pino and Y. Yan, Vol. 294 of *IAU Symp.*, Jul., 2013, pp. 359–360.
- Gibbons, P.G., Mamatsashvili, G.R. and Rice, W.K.M., Planetary formation in self-gravitating discs - the effects of particle self-gravity and back-reaction. *Month. Not. Roy. Astron. Soc.*, 2014, **442**, 361–371.
- Gibbons, P.G., Mamatsashvili, G.R. and Rice, W.K.M., Planetary formation in self-gravitating discs - dust trapping by vortices. *Month. Not. Roy. Astron. Soc.*, 2015, **453**, 4232–4243.
- Gibbons, P.G., Rice, W.K.M. and Mamatsashvili, G.R., Planetary formation in self-gravitating discs. *Month. Not. Roy. Astron. Soc.*, 2012, **426**, 1444–1454.
- Goffrey, T., Pratt, J., Viallet, M., Baraffe, I., Popov, M.V., Walder, R., Folini, D., Geroux, C. and Constantino, T., Benchmarking the Multidimensional Stellar Implicit Code MUSIC. *Astron. Astrophys.*, 2017, **600**, A7.
- Green, C., Brandenburg, A. and Kosovichev, A., Non-linear Modeling of Wavelike Behaviour of Supergranulation. *AGU Spring Meeting Abstracts*, 2008.
- Gressel, O. and Elstner, D., On the spatial and temporal non-locality of dynamo mean-field effects in supersonic interstellar turbulence. *Month. Not. Roy. Astron. Soc.*, 2020, **494**, 1180–1188.
- Guerrero, G., Global simulations of stellar dynamos., 2020, arXiv:2001.10665.
- Guerrero, G., Chatterjee, P. and Brandenburg, A., Shear-driven and diffusive helicity fluxes in  $\alpha\Omega$  dynamos. *Month. Not. Roy. Astron. Soc.*, 2010, **409**, 1619–1630.
- Guerrero, G. and Käpylä, P.J., Dynamo action and magnetic buoyancy in convection simulations with vertical shear. *Astron. Astrophys.*, 2011, **533**, A40.
- Guerrero, G., Rheinhardt, M., Brandenburg, A. and Dikpati, M., Theoretical comparison of plasma and magnetic feature tracking (MFT) flows: a perspective for assimilating meridional flow data in flux-transport models. *AGU Fall Meeting Abstracts*, 2011, p. A3.
- Guerrero, G., Rheinhardt, M., Brandenburg, A. and Dikpati, M., Plasma flow versus magnetic feature-tracking speeds in the Sun. *Month. Not. Roy. Astron. Soc.*, 2012, **420**, L1–L5.

- Gustafsson, M., Brandenburg, A., Lemaire, J.L. and Field, D., The nature of turbulence in OMC1 at the scale of star formation: observations and simulations. *Astron. Astrophys.*, 2006, **454**, 815–825.
- Gustafsson, M., Brandenburg, A., Lemaire, J.L. and Field, D., Probing turbulence in OMC1 at the star forming scale: observations and simulations; in *IAU Symp.*, edited by B.G. Elmegreen and J. Palous, Vol. 237 of *IAU Symp.*, 2007, pp. 183–187.
- Hanasz, M., Kowalik, K., Wóltński, D. and Pawłasek, R., The PIERNIK MHD code - a multi-fluid, non-ideal extension of the relaxing-TVD scheme (I); in *EAS Publications Series*, edited by K. Goździewski, A. Niedzielski and J. Schneider, Vol. 42 of *EAS Publications Series*, Apr., 2010, pp. 275–280.
- Hanawa, T. and Matsumoto, Y., A Proper Discretization of Hydrodynamic Equations in Cylindrical Coordinates for Astrophysical Simulations. *Astrophys. J.*, 2021, **907**, 43.
- Haugen, N.E., Brandenburg, A. and Dobler, W., Simulations of nonhelical hydromagnetic turbulence. *Phys. Rev. E*, 2004a, **70**, 016308.
- Haugen, N.E.L. and Brandenburg, A., Inertial range scaling in numerical turbulence with hyperviscosity. *Phys. Rev. E*, 2004a, **70**, 026405.
- Haugen, N.E.L. and Brandenburg, A., Suppression of small scale dynamo action by an imposed magnetic field. *Phys. Rev. E*, 2004b, **70**, 036408.
- Haugen, N.E.L. and Brandenburg, A., Hydrodynamic and hydro-magnetic energy spectra from large eddy simulations. *Phys. Fluids*, 2006, **18**, 075106.
- Haugen, N.E.L., Brandenburg, A. and Dobler, W., Is Nonhelical Hydromagnetic Turbulence Peaked at Small Scales?. *Astrophys. J. Lett.*, 2003, **597**, L141–L144.
- Haugen, N.E.L., Brandenburg, A. and Dobler, W., High-Resolution Simulations of Nonhelical MHD Turbulence. *Astrophys. Space Sci.*, 2004b, **292**, 53–60.
- Haugen, N.E.L., Brandenburg, A. and Mee, A.J., Mach number dependence of the onset of dynamo action. *Month. Not. Roy. Astron. Soc.*, 2004c, **353**, 947–952.
- Haugen, N.E.L., Brandenburg, A., Sandin, C. and Mattsson, L., Spectral characterisation of inertial particle clustering in turbulence. *J. Fluid Mech.*, submitted, 2021a, arXiv:2105.01539.
- Haugen, N.E.L., Kleeorin, N., Rogachevskii, I. and Brandenburg, A., Detection of turbulent thermal diffusion of particles in numerical simulations. *Phys. Fluids*, 2012, **24**, 075106.
- Haugen, N.E.L., Kragset, S., Bugge, M., Warnecke, R. and Weghaus, M., Particle impaction efficiency and size distribution in a MSWI super heater tube bundle. *arXiv:1008.5040*, 2010.
- Haugen, N.E.L., Kruger, J., Mitra, D. and Løvås, T., The effect of turbulence on mass and heat transfer rates of small inertial particles. *arXiv:1701.04567*, 2017.
- Haugen, N.E.L., Brandenburg, A., Sandin, C. and Mattsson, L., Spectral characterisation of inertial particle clustering in turbulence. *J. Fluid Mech.*, 2022, **934**, A37.
- Haugen, N.E.L., Krüger, J., Aarnes, J.R., Karchniwy, E. and Klimanek, A., Thermophoresis and its effect on particle impaction on a cylinder for low and moderate Reynolds numbers. *arXiv e-prints*, 2021b, arXiv:2103.07136.
- Hawley, J.F., MHD simulations of accretion disks and jets: strengths and limitations. *Astrophys. Space Sci.*, 2009, **320**, 107–114.
- He, Y., Brandenburg, A. and Sinha, A., Tensor spectrum of turbulence-sourced gravitational waves as a constraint on graviton mass. *J. Cosmol. Astropart. Phys.*, 2021a, **2021**, 015.
- He, Y., Roper Pol, A. and Brandenburg, A., Leading-order non-linear gravitational waves from reheating magnetogeneses. , 2021b, arXiv:2110.14456.
- He, Y., Roper Pol, A. and Brandenburg, A., Modified propagation of gravitational waves from the early radiation era. *arXiv e-prints*, 2022, arXiv:2212.06082.
- Hedvall, R. and Mattsson, L., Kinetics and Clustering of Dust Particles in Supersonic Turbulence with Self-gravity. *Res. Not. Am. Astron. Soc.*, 2019, **3**, 82.
- Heinemann, T., Dobler, W., Nordlund, Å. and Brandenburg, A., Radiative transfer in decomposed domains. *Astron. Astrophys.*, 2006, **448**, 731–737.
- Heinemann, T., Nordlund, Å., Scharmer, G.B. and Spruit, H.C., MHD Simulations of Penumbra Fine Structure. *Astrophys. J.*, 2007, **669**, 1390–1394.
- Heinemann, T. and Papaloizou, J.C.B., The excitation of spiral density waves through turbulent fluctuations in accretion discs - II. Numerical simulations with MRI-driven turbulence. *Month. Not. Roy. Astron. Soc.*, 2009, **397**, 64–74.
- Hernandez, B., Geogdzhayeva, M., Beltre, C., Ocasio, A., Skarbinski, M., Zbib, D., Swar, P. and Mac Low, M., BridgeUP: STEM and Learning Astrophysics Interactively; in *American Astronomical Society Meeting Abstracts*, Jan., 2018.
- Hernandez, B., Mac Low, M.M., Lyra, W., McKernan, B. and Ford, K.E.S., Migration of Embedded Black Holes in Active Galactic Nucleus Disk Simulations; in *American Astronomical Society Meeting Abstracts #233*, Vol. 233 of *American Astronomical Society Meeting Abstracts*, Jan, 2019, p. 369.18.
- Hidalgo, J.P., Käpylä, P.J., Ortiz-Rodríguez, C.A., Navarrete, F.H., Toro, B. and Schleicher, D.R.G., Origin of magnetism in early-type stars. *arXiv e-prints*, 2023, arXiv:2303.10707.
- Hollins, J.F., Sarson, G.R., Shukurov, A., Fletcher, A. and Gent, F.A., Supernova-regulated ISM. V. Space and Time Correlations. *Astrophys. J.*, 2017, **850**, 4.
- Hopkins, P.F., A new class of accurate, mesh-free hydrodynamic simulation methods. *Month. Not. Roy. Astron. Soc.*, 2015, **450**, 53–110.

- Hord, B., Lyra, W., Flock, M., Turner, N.J. and Mac Low, M.M., On Shocks Driven by High-mass Planets in Radiatively Inefficient Disks. III. Observational Signatures in Thermal Emission and Scattered Light. *Astrophys. J.*, 2017, **849**, 164.
- Horn, B., Lyra, W., Mac Low, M.M. and Sándor, Z., Orbital Migration of Interacting Low-mass Planets in Evolutionary Radiative Turbulent Models. *Astrophys. J.*, 2012, **750**, 34.
- Hubbard, A., Turbulence-induced collisional velocities and density enhancements: large inertial range results from shell models. *Month. Not. Roy. Astron. Soc.*, 2012, **426**, 784–795.
- Hubbard, A., High Temperature Mineral Formation by Short Circuits in Protoplanetary Disks, NASA Proposal #13-OSS13-80 2013.
- Hubbard, A. and Brandenburg, A., Memory Effects in Turbulent Transport. *Astrophys. J.*, 2009, **706**, 712–726.
- Hubbard, A. and Brandenburg, A., Magnetic helicity fluxes in an  $\alpha^2$  dynamo embedded in a halo. *Geophys. Astrophys. Fluid Dynam.*, 2010, **104**, 577–590.
- Hubbard, A. and Brandenburg, A., Magnetic Helicity Flux in the Presence of Shear. *Astrophys. J.*, 2011, **727**, 11.
- Hubbard, A. and Brandenburg, A., Catastrophic Quenching in  $\alpha\Omega$  Dynamos Revisited. *Astrophys. J.*, 2012, **748**, 51.
- Hubbard, A., Del Sordo, F., Käpylä, P.J. and Brandenburg, A., The  $\alpha$  effect with imposed and dynamo-generated magnetic fields. *Month. Not. Roy. Astron. Soc.*, 2009, **398**, 1891–1899.
- Hubbard, A., Rheinhardt, M. and Brandenburg, A., The fratricide of  $\alpha\Omega$  dynamos by their  $\alpha^2$  siblings. *Astron. Astrophys.*, 2011, **535**, A48.
- Hupfer, C., Käpylä, P.J. and Stix, M., Reynolds stresses and meridional circulation from rotating cylinder simulations. *Astron. Astrophys.*, 2006, **459**, 935–944.
- Hyder, A., Lyra, W., Chanover, N., Morales-Juberías, R. and Jackiewicz, J., Vortex Dynamics in the Polar Atmosphere of Jupiter; in *AAS/Division for Planetary Sciences Meeting Abstracts*, Vol. 52 of *AAS/Division for Planetary Sciences Meeting Abstracts*, Oct., 2020, p. 103.01.
- Hyder, A., Lyra, W., Chanover, N., Morales-Juberías, R. and Jackiewicz, J., Vortex Dynamics at the Jovian Pole; in *AAS/Division for Planetary Sciences Meeting Abstracts*, Vol. 53 of *AAS/Division for Planetary Sciences Meeting Abstracts*, Oct., 2021, p. 409.04.
- Hyder, A., Lyra, W., Chanover, N., Morales-Juberías, R. and Jackiewicz, J., Exploring Jupiter’s Polar Deformation Lengths with High-resolution Shallow Water Modeling. *Planet. Sci. J.*, 2022, **3**, 166.
- Hydly Rivedal, N., Granskogen Bjørnstad, A. and Haugen, N.E.L., The effect of turbulence on the particle impactation on a cylinder in a cross flow. *arXiv:1109.1135*, 2011.
- Jabbari, S., Magnetic Flux Concentrations in Stratified Turbulent Plasma Due to Negative Effective Magnetic Pressure Instability. *IAU General Assembly*, 2015, **22**, 2254998.
- Jabbari, S. and Brandenburg, A., Magnetic Flux Concentrations in Stratified Turbulent Plasma Due to Negative Effective Magnetic Pressure Instability. *AGU Fall Meeting Abstracts*, 2014.
- Jabbari, S., Brandenburg, A., Kleeorin, N., Mitra, D. and Rogachevskii, I., Surface flux concentrations in a spherical  $\alpha^2$  dynamo. *Astron. Astrophys.*, 2013, **556**, A106.
- Jabbari, S., Brandenburg, A., Kleeorin, N., Mitra, D. and Rogachevskii, I., Bipolar Magnetic Spots from Dynamos in Stratified Spherical Shell Turbulence. *Astrophys. J.*, 2015, **805**, 166.
- Jabbari, S., Brandenburg, A., Losada, I.R., Kleeorin, N. and Rogachevskii, I., Magnetic flux concentrations from dynamo-generated fields. *Astron. Astrophys.*, 2014, **568**, A112.
- Jabbari, S., Brandenburg, A., Mitra, D., Kleeorin, N. and Rogachevskii, I., Turbulent reconnection of magnetic bipoles in stratified turbulence. *Month. Not. Roy. Astron. Soc.*, 2016, **459**, 4046–4056.
- Jabbari, S., Brandenburg, A., Kleeorin, N. and Rogachevskii, I., Sharp magnetic structures from dynamos with density stratification. *Month. Not. Roy. Astron. Soc.*, 2017, **467**, 2753–2765.
- Jakab, P. and Brandenburg, A., The effect of a dynamo-generated field on the Parker wind, 2020, arXiv:2006.02971.
- Jakab, P. and Brandenburg, A., The effect of a dynamo-generated field on the Parker wind. *Astron. Astrophys.*, 2021, **647**, A18.
- Jenkins, I., Challis, C.D., Keeling, D.L. and Surrey, E., Scoping Studies for NBI Launch Geometries on DEMO. *arXiv:1403.6349*, 2014.
- Jóhannesson, G., Porter, T.A. and Moskalenko, I.V., Cosmic-Ray Propagation in Light of the Recent Observation of Geminga. *Astrophys. J.*, 2019, **879**, 91.
- Johansen, A., Andersen, A.C. and Brandenburg, A., Simulations of dust-trapping vortices in protoplanetary discs. *Astron. Astrophys.*, 2004, **417**, 361–374.
- Johansen, A., Brauer, F., Dullemond, C., Klahr, H. and Henning, T., A coagulation-fragmentation model for the turbulent growth and destruction of preplanetesimals. *Astron. Astrophys.*, 2008, **486**, 597–611.
- Johansen, A., Henning, T. and Klahr, H., Dust Sedimentation and Self-sustained Kelvin-Helmholtz Turbulence in Protoplanetary Disk Midplanes. *Astrophys. J.*, 2006a, **643**, 1219–1232.
- Johansen, A., Kato, M. and Sano, T., A new viscous instability in weakly ionised protoplanetary discs; in *Advances in Plasma Astrophysics*, edited by A. Bonanno, E. de Gouveia Dal Pino and A.G. Kosovichev, Vol. 274 of *IAU Symp.*, Jun., 2011a, pp. 50–55.
- Johansen, A. and Klahr, H., Dust Diffusion in Protoplanetary Disks by Magnetorotational Turbulence. *Astrophys. J.*, 2005, **634**, 1353–1371.
- Johansen, A., Klahr, H. and Henning, T., Gravoturbulent Formation of Planetesimals; in *Protostars and Planets V*, 2005, p. 8004.

- Johansen, A., Klahr, H. and Henning, T., Gravoturbulent Formation of Planetesimals. *Astrophys. J.*, 2006b, **636**, 1121–1134.
- Johansen, A., Klahr, H. and Henning, T., High-resolution simulations of planetesimal formation in turbulent protoplanetary discs; in *The Astrophysics of Planetary Systems: Formation, Structure, and Dynamical Evolution*, edited by A. Sozzetti, M.G. Lattanzi and A.P. Boss, Vol. 276 of *IAU Symp.*, Nov., 2011b, pp. 89–94.
- Johansen, A., Klahr, H. and Henning, T., High-resolution simulations of planetesimal formation in turbulent protoplanetary discs. *Astron. Astrophys.*, 2011c, **529**, A62.
- Johansen, A., Klahr, H. and Mee, A.J., Turbulent diffusion in protoplanetary discs: the effect of an imposed magnetic field. *Month. Not. Roy. Astron. Soc.*, 2006c, **370**, L71–L75.
- Johansen, A. and Lacerda, P., Prograde rotation of protoplanets by accretion of pebbles in a gaseous environment. *Month. Not. Roy. Astron. Soc.*, 2010, **404**, 475–485.
- Johansen, A. and Levin, Y., High accretion rates in magnetised Keplerian discs mediated by a Parker instability driven dynamo. *Astron. Astrophys.*, 2008, **490**, 501–514.
- Johansen, A., Mac Low, M.M., Lacerda, P. and Bizzarro, M., Growth of asteroids, planetary embryos, and Kuiper belt objects by chondrule accretion. *Science Advances*, 2015, **1**, 1500109.
- Johansen, A., Oishi, J.S., Mac Low, M.M., Klahr, H., Henning, T. and Youdin, A., Rapid planetesimal formation in turbulent circumstellar disks. *Nature*, 2007a, **448**, 1022–1025.
- Johansen, A., Oishi, J.S., Mac Low, M.M., Klahr, H., Henning, T. and Youdin, A., Supplementary Information for “Rapid planetesimal formation in turbulent circumstellar disks”. *arXiv:0708.3893*, 2007b.
- Johansen, A. and Youdin, A., Protoplanetary Disk Turbulence Driven by the Streaming Instability: Nonlinear Saturation and Particle Concentration. *Astrophys. J.*, 2007, **662**, 627–641.
- Johansen, A., Youdin, A. and Klahr, H., Zonal Flows and Long-lived Axisymmetric Pressure Bumps in Magnetorotational Turbulence. *Astrophys. J.*, 2009a, **697**, 1269–1289.
- Johansen, A., Youdin, A. and Mac Low, M.M., Particle Clumping and Planetesimal Formation Depend Strongly on Metallicity. *Astrophys. J. Lett.*, 2009b, **704**, L75–L79.
- Johansen, A., Youdin, A.N. and Lithwick, Y., Adding particle collisions to the formation of asteroids and Kuiper belt objects via streaming instabilities. *Astron. Astrophys.*, 2012, **537**, A125.
- Kahniashvili, T., Brandenburg, A., Campanelli, L., Ratra, B. and Tevzadze, A.G., Evolution of inflation-generated magnetic field through phase transitions. *Phys. Rev. D*, 2012, **86**, 103005.
- Kahniashvili, T., Brandenburg, A. and Tevzadze, A.G., The evolution of primordial magnetic fields since their generation. *Phys. Scr.*, 2016, **91**, 104008.
- Kahniashvili, T., Brandenburg, A., Tevzadze, A.G. and Ratra, B., Numerical simulations of the decay of primordial magnetic turbulence. *Phys. Rev. D*, 2010, **81**, 123002.
- Kahniashvili, T., Tevzadze, A.G., Brandenburg, A. and Neronov, A., Evolution of primordial magnetic fields from phase transitions. *Phys. Rev. D*, 2013, **87**, 083007.
- Kahniashvili, T., Brandenburg, A., Durrer, R., Tevzadze, A.G. and Yin, W., Scale-invariant helical magnetic field evolution and the duration of inflation. *J. Cosm. Astro-Part. Phys.*, 2017, **2017**, 002.
- Kahniashvili, T., Brandenburg, A., Gogoberidze, G., Mandal, S. and Pol, A.R., Circular polarization of gravitational waves from early-Universe helical turbulence. *Phys. Rev. Res.*, 2021, **3**, 013193.
- Kahniashvili, T., Brandenburg, A., Kosowsky, A., Mandal, S. and Roper Pol, A., Magnetism in the Early Universe; in *IAU General Assembly*, Mar., 2020, pp. 295–298.
- Kahniashvili, T., Clarke, E., Stepp, J. and Brandenburg, A., Big Bang Nucleosynthesis Limits and Relic Gravitational-Wave Detection Prospects. *Phys. Rev. Lett.*, 2022, **128**, 221301.
- Käpylä, M.J., Rheinhardt, M. and Brandenburg, A., Compressible Test-field Method and Its Application to Shear Dynamos. *Astrophys. J.*, 2022, **932**, 8.
- Käpylä, M.J., Vizoso, J.Á., Rheinhardt, M., Brandenburg, A. and Singh, N.K., On the Existence of Shear-current Effects in Magnetized Burgulence. *Astrophys. J.*, 2020a, **905**, 179.
- Käpylä, P.J., Prandtl number dependence of stellar convection: Flow statistics and convective energy transport. *Astron. Astrophys.*, 2021a, **655**, A78.
- Käpylä, P.J., Star-in-a-box simulations of fully convective stars. *Astron. Astrophys.*, 2021b, **651**, A66.
- Käpylä, P.J., Transition from anti-solar to solar-like differential rotation: Dependence on Prandtl number. *Astron. Astrophys.*, 2023, **669**, A98.
- Käpylä, P.J. and Brandenburg, A., Turbulent viscosity and  $\Lambda$ -effect from numerical turbulence models. *Astron. Nachr.*, 2007, **328**, 1006–1008.
- Käpylä, P.J. and Brandenburg, A., Lambda effect from forced turbulence simulations. *Astron. Astrophys.*, 2008, **488**, 9–23.
- Käpylä, P.J. and Brandenburg, A., Turbulent Dynamos with Shear and Fractional Helicity. *Astrophys. J.*, 2009, **699**, 1059–1066.
- Käpylä, P.J., Brandenburg, A., Kleeorin, N., Mantere, M.J. and Rogachevskii, I., Negative effective magnetic pressure in turbulent convection. *Month. Not. Roy. Astron. Soc.*, 2012a, **422**, 2465–2473.
- Käpylä, P.J., Brandenburg, A., Kleeorin, N., Mantere, M.J. and Rogachevskii, I., Flux concentrations in turbulent convection; in *IAU Symp.*, edited by A.G. Kosovichev, E. de Gouveia Dal Pino and Y. Yan, Vol. 294 of *IAU Symp.*, Jul., 2013a, pp. 283–288.

- Käpylä, P.J., Brandenburg, A., Korpi, M.J., Snellman, J.E. and Narayan, R., Angular Momentum Transport in Convectively Unstable Shear Flows. *Astrophys. J.*, 2010a, **719**, 67–76.
- Käpylä, P.J., Gent, F.A., Olsper, N., Käpylä, M.J. and Brandenburg, A., Sensitivity to luminosity, centrifugal force, and boundary conditions in spherical shell convection. *Geophys. Astrophys. Fluid Dynam.*, 2020b, **114**, 8–34.
- Käpylä, P.J., Käpylä, M.J. and Brandenburg, A., Confirmation of bistable stellar differential rotation profiles. *Astron. Astrophys.*, 2014, **570**, A43.
- Käpylä, P.J., Käpylä, M.J. and Brandenburg, A., Small-scale dynamos in simulations of stratified turbulent convection. *Astronomische Nachrichten*, 2018, **339**, 127–133.
- Käpylä, P.J., Käpylä, M.J., Olsper, N., Warnecke, J. and Brandenburg, A., Convection-driven spherical shell dynamos at varying Prandtl numbers. *Astron. Astrophys.*, 2017a, **599**, A4.
- Käpylä, P.J. and Korpi, M.J., Magnetorotational instability driven dynamos at low magnetic Prandtl numbers. *Month. Not. Roy. Astron. Soc.*, 2011, **413**, 901–907.
- Käpylä, P.J., Korpi, M.J. and Brandenburg, A., Large-scale dynamos in turbulent convection with shear. *Astron. Astrophys.*, 2008, **491**, 353–362.
- Käpylä, P.J., Korpi, M.J. and Brandenburg, A., Alpha effect and turbulent diffusion from convection. *Astron. Astrophys.*, 2009a, **500**, 633–646.
- Käpylä, P.J., Korpi, M.J. and Brandenburg, A., Large-scale Dynamos in Rigidly Rotating Turbulent Convection. *Astrophys. J.*, 2009b, **697**, 1153–1163.
- Käpylä, P.J., Korpi, M.J. and Brandenburg, A., Open and closed boundaries in large-scale convective dynamos. *Astron. Astrophys.*, 2010b, **518**, A22.
- Käpylä, P.J., Korpi, M.J. and Brandenburg, A., The  $\alpha$  effect in rotating convection with sinusoidal shear. *Month. Not. Roy. Astron. Soc.*, 2010c, **402**, 1458–1466.
- Käpylä, P.J., Korpi, M.J., Brandenburg, A., Mitra, D. and Tavakol, R., Convective dynamos in spherical wedge geometry. *Astron. Nachr.*, 2010d, **331**, 73.
- Käpylä, P.J., Mantere, M.J. and Brandenburg, A., Effects of stratification in spherical shell convection. *Astron. Nachr.*, 2011a, **332**, 883.
- Käpylä, P.J., Mantere, M.J. and Brandenburg, A., Cyclic Magnetic Activity due to Turbulent Convection in Spherical Wedge Geometry. *Astrophys. J. Lett.*, 2012b, **755**, L22.
- Käpylä, P.J., Mantere, M.J. and Brandenburg, A., Oscillatory large-scale dynamos from Cartesian convection simulations. *Geophys. Astrophys. Fluid Dynam.*, 2013b, **107**, 244–257.
- Käpylä, P.J., Mantere, M.J., Cole, E., Warnecke, J. and Brandenburg, A., Effects of Enhanced Stratification on Equatorward Dynamo Wave Propagation. *Astrophys. J.*, 2013c, **778**, 41.
- Käpylä, P.J., Mantere, M.J., Guerrero, G., Brandenburg, A. and Chatterjee, P., Reynolds stress and heat flux in spherical shell convection. *Astron. Astrophys.*, 2011b, **531**, A162.
- Käpylä, P.J., Mantere, M.J. and Hackman, T., Starspots due to Large-scale Vortices in Rotating Turbulent Convection. *Astrophys. J.*, 2011c, **742**, 34.
- Käpylä, P.J., Mitra, D. and Brandenburg, A., Numerical study of large-scale vorticity generation in shear-flow turbulence. *Phys. Rev. E*, 2009c, **79**, 016302.
- Käpylä, P.J., Viviani, M., Käpylä, M.J., Brandenburg, A. and Spada, F., Effects of a subadiabatic layer on convection and dynamos in spherical wedge simulations. *Geophys. Astrophys. Fluid Dynam.*, 2019, **113**, 149–183.
- Käpylä, P.J., Overshooting in simulations of compressible convection, 2018, arXiv:1812.07916.
- Käpylä, P.J., Effects of small-scale dynamo and compressibility on the  $\Lambda$  effect, 2019, arXiv:1903.04363.
- Käpylä, P.J., Solar-like Dynamos and Rotational Scaling of Cycles from Star-in-a-box Simulations. *Astrophys. J. Lett.*, 2022, **931**, L17.
- Käpylä, P.J., Rheinhardt, M., Brandenburg, A., Arlt, R., Käpylä, M.J., Lagg, A., Olsper, N. and Warnecke, J., Extended Subadiabatic Layer in Simulations of Overshooting Convection. *Astrophys. J.*, 2017b, **845**, L23.
- Käpylä, P.J. and Singh, N.K., Turbulent Prandtl number from isotropically forced turbulence. *J. Fluid Mech.*, 2022, **952**, R1.
- Karak, B.B. and Brandenburg, A., Is the Small-scale Magnetic Field Correlated with the Dynamo Cycle?. *Astrophys. J.*, 2016, **816**, 28.
- Karak, B.B., Käpylä, P.J., Käpylä, M.J., Brandenburg, A., Olsper, N. and Pelt, J., Magnetically controlled stellar differential rotation near the transition from solar to anti-solar profiles. *Astron. Astrophys.*, 2015a, **576**, A26.
- Karak, B.B., Kitchatinov, L.L. and Brandenburg, A., Hysteresis between Distinct Modes of Turbulent Dynamos. *Astrophys. J.*, 2015b, **803**, 95.
- Karak, B.B., Rheinhardt, M., Brandenburg, A., Käpylä, P.J. and Käpylä, M.J., Quenching and Anisotropy of Hydromagnetic Turbulent Transport. *Astrophys. J.*, 2014, **795**, 16.
- Karchniwy, E., Haugen, N.E.L. and Klimanek, A., A numerical study on the combustion of a resolved carbon particle. *Comb. Flame*, 2022, **238**, 111880.
- Karchniwy, E., Klimanek, A. and Haugen, N.E.L., The effect of turbulence on mass transfer rates between inertial particles and fluid for polydisperse particle size distributions. *J. Fluid Mech.*, 2019, **874**, 1147–1168.
- Kemel, K., Brandenburg, A. and Ji, H., Model of driven and decaying magnetic turbulence in a cylinder. *Phys. Rev. E*, 2011a, **84**, 056407.



- Kemel, K., Brandenburg, A., Kleeorin, N., Mitra, D. and Rogachevskii, I., Spontaneous Formation of Magnetic Flux Concentrations in Stratified Turbulence. *Sol. Phys.*, 2012a, **280**, 321–333.
- Kemel, K., Brandenburg, A., Kleeorin, N., Mitra, D. and Rogachevskii, I., Active Region Formation through the Negative Effective Magnetic Pressure Instability. *Sol. Phys.*, 2013a, **287**, 293–313.
- Kemel, K., Brandenburg, A., Kleeorin, N. and Rogachevskii, I., The negative magnetic pressure effect in stratified turbulence; in *IAU Symp.*, edited by D. Prasad Choudhary and K.G. Strassmeier, Vol. 273 of *IAU Symp.*, Aug., 2011b, pp. 83–88.
- Kemel, K., Brandenburg, A., Kleeorin, N. and Rogachevskii, I., Turbulent magnetic pressure instability in stratified turbulence; in *IAU Symp.*, edited by A. Bonanno, E. de Gouveia Dal Pino and A.G. Kosovichev, Vol. 274 of *IAU Symp.*, Jun., 2011c, pp. 473–475.
- Kemel, K., Brandenburg, A., Kleeorin, N. and Rogachevskii, I., Properties of the negative effective magnetic pressure instability. *Astron. Nachr.*, 2012b, **333**, 95.
- Kemel, K., Brandenburg, A., Kleeorin, N. and Rogachevskii, I., Non-uniformity effects in the negative effective magnetic pressure instability. *Phys. Scripta Vol. T*, 2013b, **155**, 014027.
- Kirchschlager, F., Mattsson, L. and Gent, F.A., Supernova induced processing of interstellar dust: impact of ISM gas density and gas turbulence. *Month. Not. Roy. Astron. Soc.*, 2021, p. 3218–3234.
- Kirchschlager, F., Mattsson, L. and Gent, F.A., Supernova induced processing of interstellar dust: impact of interstellar medium gas density and gas turbulence. *Month. Not. Roy. Astron. Soc.*, 2022, **509**, 3218–3234.
- Kitchatinov, L.L. and Brandenburg, A., Transport of angular momentum and chemical species by anisotropic mixing in stellar radiative interiors. *Astron. Nachr.*, 2012, **333**, 230.
- Klahr, H., From boulders to planetary systems. *New Astron. Rev.*, 2008, **52**, 78–93.
- Klahr, H. and Schreiber, A., Turbulence Sets the Length Scale for Planetesimal Formation: Local 2D Simulations of Streaming Instability and Planetesimal Formation. *Astrophys. J.*, 2020, **901**, 54.
- Klahr, H. and Schreiber, A., Testing the Jeans, Toomre, and Bonnor-Ebert Concepts for Planetesimal Formation: 3D Streaming-instability Simulations of Diffusion-regulated Formation of Planetesimals. *Astrophys. J.*, 2021, **911**, 9.
- Kley, W., Modelling the evolution of planets in disks. *arXiv:0910.4386*, 2009.
- Korpi, M.J., Käpylä, P.J. and Väisälä, M.S., Influence of Ohmic diffusion on the excitation and dynamics of MRI. *Astron. Nachr.*, 2010, **331**, 34.
- Korsós, M.B., Chatterjee, P. and Erdélyi, R., Applying the Weighted Horizontal Magnetic Gradient Method to a Simulated Flaring Active Region. *Astrophys. J.*, 2018, **857**, 103.
- Krüger, J., Haugen, N.E.L., Mitra, D. and Løvås, T., The effect of turbulent clustering on particle reactivity. *arXiv:1607.03720*, 2016.
- Krumholz, M.R. and Forbes, J.C., VADER: A flexible, robust, open-source code for simulating viscous thin accretion disks. *Astron. Computing*, 2015, **11**, 1–17.
- Kuchner, M.J., Richert, A.J.W. and Lyra, W., Rings and Spirals Forming by Themselves: the Photoelectric Instability in Debris Disks and Transitional disks, Now with Radiation Pressure.; in *American Astronomical Society Meeting Abstracts*, Jan., 2018.
- Kulikov, I., A new GPU-accelerated hydrodynamical code for numerical simulation of interacting galaxies. *arXiv:1311.0861*, 2013.
- Kulikov, I., Chernykh, I. and Tutukov, A., A New Hydrodynamic Model for Numerical Simulation of Interacting Galaxies on Intel Xeon Phi Supercomputers. *J. Phys. Conf. Ser.*, 2016, **719**, 012006.
- Kupka, F. and Muthsam, H.J., Modelling of stellar convection. *Living Reviews in Computational Astrophysics*, 2017, **3**, 1.
- Lambrechts, M., Growth of Gas-giant Cores in Protoplanetary Disks; in *AAS/Division for Extreme Solar Systems Abstracts*, Vol. 2 of *AAS/Division for Extreme Solar Systems Abstracts*, Sep., 2011, p. 33.02.
- Lambrechts, M. and Johansen, A., Rapid growth of gas-giant cores by pebble accretion. *Astron. Astrophys.*, 2012, **544**, A32.
- Lambrechts, M., Johansen, A., Capelo, H.L., Blum, J. and Bodenschatz, E., Spontaneous concentrations of solids through two-way drag forces between gas and sedimenting particles. *Astron. Astrophys.*, 2016, **591**, A133.
- Latter, H.N. and Papaloizou, J.C.B., Hysteresis and thermal limit cycles in MRI simulations of accretion discs. *Month. Not. Roy. Astron. Soc.*, 2012, **426**, 1107–1120.
- Lemaster, M.N. and Stone, J.M., Dissipation and Heating in Supersonic Hydrodynamic and MHD Turbulence. *Astrophys. J.*, 2009, **691**, 1092–1108.
- Li, R. and Youdin, A.N., Thresholds for Particle Clumping by the Streaming Instability. *Astrophys. J.*, 2021, **919**, 107.
- Li, R., Youdin, A.N. and Simon, J.B., On the Numerical Robustness of the Streaming Instability: Particle Concentration and Gas Dynamics in Protoplanetary Disks. *Astrophys. J.*, 2018a, **862**, 14.
- Li, X.Y., Brandenburg, A., Haugen, N.E.L. and Svensson, G., Eulerian and Lagrangian approaches to multidimensional condensation and collection. *J. Adv. Model. Earth Systems*, 2017, **9**, 1116–1137.
- Li, X.Y., Brandenburg, A., Svensson, G., Haugen, N.E.L., Mehlig, B. and Rogachevskii, I., Effect of Turbulence on Collisional Growth of Cloud Droplets. *J. Atmos. Sci.*, 2018b, **75**, 3469–3487.

- Li, X.Y., Brandenburg, A., Svensson, G., Haugen, N.E.L., Mehlig, B. and Rogachevskii, I., Condensational and Collisional Growth of Cloud Droplets in a Turbulent Environment. *J. Atmos. Sci.*, 2020, **77**, 337–353.
- Li, X.Y. and Mattsson, L., Dust Growth by Accretion of Molecules in Supersonic Interstellar Turbulence. *Astrophys. J.*, 2020, **903**, 148.
- Li, X.Y. and Mattsson, L., Coagulation of inertial particles in supersonic turbulence. *Astron. Astrophys.*, 2021, **648**, A52.
- Li, X.Y., Mehlig, B., Svensson, G., Brandenburg, A. and Haugen, N.E.L., Collision Fluctuations of Lucky Droplets with Superdroplets. *J. Atmos. Sci.*, 2022, **79**, 1821–1835.
- Li, X.Y., Svensson, G., Brandenburg, A. and Haugen, N.E.L., Cloud-droplet growth due to supersaturation fluctuations in stratiform clouds. *Atmospheric Chemistry & Physics*, 2019, **19**, 639–648.
- Liljeström, A.J., Korpi, M.J., Käpylä, P.J., Brandenburg, A. and Lyra, W., Turbulent stresses as a function of shear rate in a local disk model. *Astron. Nachr.*, 2009, **330**, 92.
- Lipatnikov, A.N. and Sabelnikov, V.A., Flame folding and conditioned concentration profiles in moderately intense turbulence. *Phys. Fluids*, 2022, **34**, 065119.
- Losada, I.R., Brandenburg, A., Kleeorin, N., Mitra, D. and Rogachevskii, I., Rotational effects on the negative magnetic pressure instability. *Astron. Astrophys.*, 2012, **548**, A49.
- Losada, I.R., Brandenburg, A., Kleeorin, N. and Rogachevskii, I., Competition of rotation and stratification in flux concentrations. *Astron. Astrophys.*, 2013, **556**, A83.
- Losada, I.R., Brandenburg, A., Kleeorin, N. and Rogachevskii, I., Magnetic flux concentrations in a polytropic atmosphere. *Astron. Astrophys.*, 2014, **564**, A2.
- Losada, I.R., Warnecke, J., Brandenburg, A., Kleeorin, N. and Rogachevskii, I., Magnetic bipoles in rotating turbulence with coronal envelope. *Astron. Astrophys.*, 2019, **621**, A61.
- Lovelace, R.V.E. and Romanova, M.M., Rossby wave instability in astrophysical discs. *Fluid Dynam. Res.*, 2014, **46**, 041401.
- Lyra, W., Elliptic and magneto-elliptic instabilities; in *Europ. Phys. J. Web Conf.*, Vol. 46 of *Europ. Phys. J. Web Conf.*, Apr., 2013, p. 4003.
- Lyra, W., Convective Overstability in Accretion Disks: Three-dimensional Linear Analysis and Nonlinear Saturation. *Astrophys. J.*, 2014, **789**, 77.
- Lyra, W., Johansen, A., Klahr, H. and Piskunov, N., Embryos grown in the dead zone. Assembling the first protoplanetary cores in low mass self-gravitating circumstellar disks of gas and solids. *Astron. Astrophys.*, 2008a, **491**, L41–L44.
- Lyra, W., Johansen, A., Klahr, H. and Piskunov, N., Global magnetohydrodynamical models of turbulence in protoplanetary disks. I. A cylindrical potential on a Cartesian grid and transport of solids. *Astron. Astrophys.*, 2008b, **479**, 883–901.
- Lyra, W., Johansen, A., Klahr, H. and Piskunov, N., Standing on the shoulders of giants. Trojan Earths and vortex trapping in low mass self-gravitating protoplanetary disks of gas and solids. *Astron. Astrophys.*, 2009a, **493**, 1125–1139.
- Lyra, W., Johansen, A., Zsom, A., Klahr, H. and Piskunov, N., Planet formation bursts at the borders of the dead zone in 2D numerical simulations of circumstellar disks. *Astron. Astrophys.*, 2009b, **497**, 869–888.
- Lyra, W. and Klahr, H., The baroclinic instability in the context of layered accretion. Self-sustained vortices and their magnetic stability in local compressible unstratified models of protoplanetary disks. *Astron. Astrophys.*, 2011, **527**, A138.
- Lyra, W. and Kuchner, M., Formation of sharp eccentric rings in debris disks with gas but without planets. *Nature*, 2013, **499**, 184–187.
- Lyra, W. and Kuchner, M.J., Sharp eccentric rings in planetless hydrodynamical models of debris disks. *arXiv:1204.6322*, 2012.
- Lyra, W. and Mac Low, M.M., Rossby Wave Instability at Dead Zone Boundaries in Three-dimensional Resistive Magnetohydrodynamical Global Models of Protoplanetary Disks. *Astrophys. J.*, 2012, **756**, 62.
- Lyra, W., Paardekooper, S.J. and Mac Low, M.M., Orbital Migration of Low-mass Planets in Evolutionary Radiative Models: Avoiding Catastrophic Infall. *Astrophys. J. Lett.*, 2010, **715**, L68–L73.
- Lyra, W., Richert, A.J.W., Boley, A., Turner, N., Mac Low, M.M., Okuzumi, S. and Flock, M., On Shocks Driven by High-mass Planets in Radiatively Inefficient Disks. II. Three-dimensional Global Disk Simulations. *Astrophys. J.*, 2016, **817**, 102.
- Lyra, W., Turner, N.J. and McNally, C.P., Rossby wave instability does not require sharp resistivity gradients. *Astron. Astrophys.*, 2015, **574**, A10.
- Lyra, W., McNally, C.P., Heinemann, T. and Masset, F., Orbital Advection with Magnetohydrodynamics and Vector Potential. *Astron. J.*, 2017, **154**, 146.
- Lyra, W., Raettig, N. and Klahr, H., Pebble-trapping Backreaction Does Not Destroy Vortices. *Res. Not. Am. Astron. Soc.*, 2018, **2**, 195.
- Madarassy, E.J.M. and Brandenburg, A., Calibrating passive scalar transport in shear-flow turbulence. *Phys. Rev. E*, 2010, **82**, 016304.
- Maiti, S., Makwana, K., Zhang, H. and Yan, H., Cosmic ray Transport in Magnetohydrodynamic turbulence. *arXiv e-prints*, 2021, arXiv:2108.01936.
- Maiti, S., Makwana, K., Zhang, H. and Yan, H., Cosmic-ray Transport in Magnetohydrodynamic Turbulence. *Astrophys. J.*, 2022, **926**, 94.

- Manser, C.J., Gänsicke, B.T., Eggl, S., Hollands, M., Izquierdo, P., Koester, D., Landstreet, J.D., Lyra, W., Marsh, T.R., Meru, F., Mustill, A.J., Rodríguez-Gil, P., Toloza, O., Veras, D., Wilson, D.J., Burleigh, M.R., Davies, M.B., Farihi, J., Gentile Fusillo, N., de Martino, D., Parsons, S.G., Quirrenbach, A., Raddi, R., Reffert, S., Del Santo, M., Schreiber, M.R., Silvotti, R., Toonen, S., Villaver, E., Wyatt, M., Xu, S. and Portegies Zwart, S., A planetesimal orbiting within the debris disc around a white dwarf star. *Science*, 2019, **364**, 66–69.
- Mantere, M.J. and Cole, E., Dynamo Action in Thermally Unstable Interstellar Flows. *Astrophys. J.*, 2012, **753**, 32.
- Mantere, M.J., Käpylä, P.J. and Hackman, T., Dependence of the large-scale vortex instability on latitude, stratification, and domain size. *Astron. Nachr.*, 2011, **332**, 876.
- Mantere, M.J., Käpylä, P.J. and Pelt, J., Role of longitudinal activity complexes for solar and stellar dynamos; in *IAU Symp.*, edited by A.G. Kosovichev, E. de Gouveia Dal Pino and Y. Yan, Vol. 294 of *IAU Symp.*, Jul., 2013, pp. 175–186.
- Mao, C., Jin, T., Luo, K. and Fan, J., Investigation of supersonic turbulent flows over a sphere by fully resolved direct numerical simulation. *Phys. Fluids*, 2019, **31**, 056102.
- Maron, J., Dennis, T., Howes, G., Brandenburg, A., Chandran, B. and Blackman, E., New Algorithms for Magnetohydrodynamics and Gravity that Emphasize Resolution and Speed.; in *AAS/Division of Dynamical Astronomy Meeting #35*, Vol. 36 of *Bull. Am. Astron. Soc.*, May, 2004, p. 854.
- Maron, J. and Mac Low, M.M., Tuned Finite-Difference Diffusion Operators. *Astrophys. J. Supp.*, 2009, **182**, 468–473.
- Maron, J.L., Mac Low, M.M. and Oishi, J.S., A Constrained-Transport Magnetohydrodynamics Algorithm with Near-Spectral Resolution. *Astrophys. J.*, 2008, **677**, 520–529.
- Maron, J.L., McNally, C.P. and Mac Low, M.M., Phurbas: An Adaptive, Lagrangian, Meshless, Magnetohydrodynamics Code. I. Algorithm. *Astrophys. J. Supp.*, 2012, **200**, 6.
- Martínez Pillet, V., Solar Surface and Atmospheric Dynamics. The Photosphere. *Space Sci. Ref.*, 2013, **178**, 141–162.
- Masada, Y. and Sano, T., Rotational Dependence of Large-scale Dynamo in Strongly-stratified Convection: What Causes It?. *Astrophys. J.*, submitted, 2022, arXiv:2206.06566.
- Matilsky, L.I. and Toomre, J., Exploring Bistability in the Cycles of the Solar Dynamo through Global Simulations. *Astrophys. J.*, 2020, **892**, 106.
- Matsumoto, Y. and Seki, K., Implementation of the CIP algorithm to magnetohydrodynamic simulations. *Computer Physics Communications*, 2008, **179**, 289–296.
- Mattsson, L., Fynbo, J.P.U. and Villarreal, B., Small-scale clustering of nano-dust grains in supersonic turbulence. *Month. Not. Roy. Astron. Soc.*, 2019a, **490**, 5788–5797.
- Mattsson, L., Bhatnagar, A., Gent, F.A. and Villarreal, B., Clustering and dynamic decoupling of dust grains in turbulent molecular clouds. *Month. Not. Roy. Astron. Soc.*, 2019b, **483**, 5623–5641.
- Mattsson, L. and Hedvall, R., Acceleration and clustering of cosmic dust in a gravoturbulent gas – I. Numerical simulation of the nearly Jeans-unstable case. , 2021, arXiv:2111.01289.
- Mattsson, L. and Hedvall, R., Acceleration and clustering of cosmic dust in a gravoturbulent gas I. Numerical simulation of the nearly Jeans-unstable case. *Month. Not. Roy. Astron. Soc.*, 2022, **509**, 3660–3676.
- McMillan, D.G. and Sarson, G.R., Geodynamo Simulations Using a High Order Cartesian Magnetohydrodynamics Code. *AGU Fall Meeting Abstracts*, 2003.
- McMillan, D.G. and Sarson, G.R., Dynamo simulations in a spherical shell of ideal gas using a high-order cartesian magnetohydrodynamics code. *Physics of the Earth and Planetary Interiors*, 2005, **153**, 124–135.
- McNally, C.P., Divergence-free interpolation of vector fields from point values - exact  $\nabla \cdot B = 0$  in numerical simulations. *Month. Not. Roy. Astron. Soc.*, 2011, **413**, L76–L80.
- McNally, C.P., Hubbard, A., Yang, C.C. and Mac Low, M.M., Temperature Fluctuations Driven by Magnetorotational Instability in Protoplanetary Disks. *Astrophys. J.*, 2014, **791**, 62.
- McNally, C.P., Lyra, W. and Passy, J.C., A Well-posed Kelvin-Helmholtz Instability Test and Comparison. *Astrophys. J. Supp.*, 2012a, **201**, 18.
- McNally, C.P., Maron, J.L. and Mac Low, M.M., Phurbas: An Adaptive, Lagrangian, Meshless, Magnetohydrodynamics Code. II. Implementation and Tests. *Astrophys. J. Supp.*, 2012b, **200**, 7.
- McNally, C.P., Nelson, R.P., Paardekooper, S.J., Gressel, O. and Lyra, W., Low mass planet migration in Hall-affected disks; in *J. Phys. Conf. Ser.*, Vol. 1031 of *J. Phys. Conf. Ser.*, May, 2018, p. 012007.
- Mee, A.J. and Brandenburg, A., Turbulence from localized random expansion waves. *Month. Not. Roy. Astron. Soc.*, 2006, **370**, 415–419.
- Meftah, J., Hydrodynamic simulations of multiple low-mass migrating black holes in AGN disks; in *Am. Astron. Soc. Meet. Abstr.*, Vol. 55 of *American Astronomical Society Meeting Abstracts*, Jan., 2023, p. 301.46.
- Mignone, A., Flock, M. and Vaidya, B., A Particle Module for the PLUTO Code. III. Dust. *Astrophys. J. Supp.*, 2019, **244**, 38.
- Mitra, D., Brandenburg, A., Kleeorin, N. and Rogachevskii, I., Intense bipolar structures from stratified helical dynamos. *Month. Not. Roy. Astron. Soc.*, 2014, **445**, 761–769.
- Mitra, D., Candelaresi, S., Chatterjee, P., Tavakol, R. and Brandenburg, A., Equatorial magnetic helicity flux in simulations with different gauges. *Astron. Nachr.*, 2010a, **331**, 130.
- Mitra, D., Käpylä, P.J., Tavakol, R. and Brandenburg, A., Alpha effect and diffusivity in helical turbulence with shear. *Astron. Astrophys.*, 2009a, **495**, 1–8.

- Mitra, D., Moss, D., Tavakol, R. and Brandenburg, A., Alleviating  $\alpha$  quenching by solar wind and meridional flows. *Astron. Astrophys.*, 2011, **526**, A138.
- Mitra, D., Tavakol, R., Brandenburg, A. and Käpylä, P.J., Oscillatory migratory large-scale fields in mean-field and direct simulations; in *IAU Symp.*, edited by A.G. Kosovichev, A.H. Andrei and J.P. Rozelot, Vol. 264 of *IAU Symp.*, Feb., 2010b, pp. 197–201.
- Mitra, D., Tavakol, R., Brandenburg, A. and Moss, D., Turbulent Dynamos in Spherical Shell Segments of Varying Geometrical Extent. *Astrophys. J.*, 2009b, **697**, 923–933.
- Mitra, D., Tavakol, R., Käpylä, P.J. and Brandenburg, A., Oscillatory Migrating Magnetic Fields in Helical Turbulence in Spherical Domains. *Astrophys. J. Lett.*, 2010c, **719**, L1–L4.
- Mitra, D., Wettlaufer, J.S. and Brandenburg, A., Can Planetesimals Form by Collisional Fusion?. *Astrophys. J.*, 2013, **773**, 120.
- Mitra, D., Haugen, N.E.L. and Rogachevskii, I., Turbophoresis in forced inhomogeneous turbulence. *Europ. Phys. J. Plus*, 2018, **133**, 35.
- Mizerski, K.A., Yokoi, N. and Brandenburg, A., Cross-helicity effect on  $\alpha$ -type dynamo in non-equilibrium turbulence. *arXiv e-prints*, 2023, arXiv:2303.01090.
- Mocz, P., Vogelsberger, M., Pakmor, R., Genel, S., Springel, V. and Hernquist, L., Reducing noise in moving-grid codes with strongly-centroidal Lloyd mesh regularization. *Month. Not. Roy. Astron. Soc.*, 2015, **452**, 3853–3862.
- Modestov, M., Bychkov, V., Brodin, G., Marklund, M. and Brandenburg, A., Evolution of the magnetic field generated by the Kelvin-Helmholtz instability. *Physics of Plasmas*, 2014, **21**, 072126.
- Mtchedlidze, S., Domínguez-Fernández, P., Du, X., Brandenburg, A., Kahniashvili, T., O’Sullivan, S., Schmidt, W. and Brüggén, M., Evolution of Primordial Magnetic Fields during Large-scale Structure Formation. *Astrophys. J.*, 2022, **929**, 127.
- Mtchedlidze, S., Domínguez-Fernández, P., Du, X., Schmidt, W., Brandenburg, A., Niemeyer, J. and Kahniashvili, T., Inflationary and Phase-transitional Primordial Magnetic Fields in Galaxy Clusters. *Astrophys. J.*, 2023, **944**, 100.
- Nauman, F. and Nättälä, J., Exploring helical dynamos with machine learning: Regularized linear regression outperforms ensemble methods. *Astron. Astrophys.*, 2019, **629**, A89.
- Navarrete, F.H., Käpylä, P.J., Schleicher, D.R.G., Ortiz, C.A. and Banerjee, R., Origin of eclipsing time variations: contributions of different modes of the dynamo-generated magnetic field. *arXiv e-prints*, 2021, arXiv:2102.11110.
- Navarrete, F.H., Käpylä, P.J., Schleicher, D.R.G., Ortiz, C.A. and Banerjee, R., Origin of eclipsing time variations: Contributions of different modes of the dynamo-generated magnetic field. *Astron. Astrophys.*, 2022, **663**, A90.
- Navarrete, F.H., Schleicher, D.R.G., Käpylä, P.J., Schober, J., Völschow, M. and Mennickent, R.E., Magnetohydrodynamical origin of eclipsing time variations in post-common-envelope binaries for solar mass secondaries. *Month. Not. Roy. Astron. Soc.*, 2020, **491**, 1043–1056.
- Nixon, C.J., King, A.R. and Pringle, J.E., The Maximum Mass Solar Nebula and the early formation of planets. *Month. Not. Roy. Astron. Soc.*, 2018, **477**, 3273–3278.
- Nordlund, Å., Magnetohydrodynamics of the Solar Atmosphere; in *The Solar-B Mission and the Forefront of Solar Physics*, edited by T. Sakurai and T. Sekii, Vol. 325 of *Astron. Soc. Pac. Conf. Ser.*, Dec., 2004, p. 165.
- Norton, A.A., Charbonneau, P. and Passos, D., Hemispheric Coupling: Comparing Dynamo Simulations and Observations. *Space Sci. Ref.*, 2014, **186**, 251–283.
- Oishi, J.S. and Mac Low, M.M., On Hydrodynamic Motions in Dead Zones. *Astrophys. J.*, 2009, **704**, 1239–1250.
- Oishi, J.S. and Mac Low, M.M., Magnetorotational Turbulence Transports Angular Momentum in Stratified Disks with Low Magnetic Prandtl Number but Magnetic Reynolds Number above a Critical Value. *Astrophys. J.*, 2011, **740**, 18.
- Oishi, J.S., Mac Low, M.M. and Menou, K., Turbulent Torques on Protoplanets in a Dead Zone. *Astrophys. J.*, 2007, **670**, 805–819.
- Oishi, J.S., Brown, B.P., Burns, K.J., Lecoanet, D. and Vasil, G.M., Perspectives on Reproducibility and Sustainability of Open-Source Scientific Software from Seven Years of the Dedalus Project, 2018, arXiv:1801.08200.
- Oliveira, D.N., Rempel, E.L., Chertovskih, R. and Karak, B.B., Chaotic transients and hysteresis in an  $\alpha^2$  dynamo model. *J. Phys. Complexity*, 2021, **2**, 025012.
- Olshevsky, V., Liang, C. and Ham, F., Turbulent convection in the Sun: modeling in unstructured meshes. *arXiv:1412.7318*, 2014.
- Ortiz-Rodríguez, C.A., Schleicher, D.R.G., Käpylä, P.J. and Navarrete, F.H., Simulations of fully convective M dwarfs: dynamo action with varying magnetic Prandtl numbers. *Boletín de la Asociación Argentina de Astronomía La Plata Argentina*, 2022, **63**, 62–64.
- Osano, B. and Adams, P., Analogue Magnetism Revisited. *arXiv:1602.09105*, 2016a.
- Osano, B. and Adams, P.W., Analogue Magnetism: An Ansatz. *arXiv:1607.00980*, 2016b.
- Osano, B. and Adams, P.W.M., Toward the analogue of a thermally generated electromagnetic field. *J. Math. Phys.*, 2017, **58**, 093101.
- Ouyed, R., Niebergal, B., Dobler, W. and Leahy, D., Three-Dimensional Simulations of the Reorganization of a Quark Star’s Magnetic Field as Induced by the Meissner Effect. *Astrophys. J.*, 2006, **653**, 558–567.

- Paardekooper, S.J., Dong, R., Duffell, P., Fung, J., Masset, F.S., Ogilvie, G. and Tanaka, H., Planet-Disk Interactions. *arXiv e-prints*, 2022, arXiv:2203.09595.
- Pan, L. and Padoan, P., Turbulence-induced Relative Velocity of Dust Particles. I. Identical Particles. *Astrophys. J.*, 2013, **776**, 12.
- Pan, L. and Padoan, P., Turbulence-induced Relative Velocity of Dust Particles. IV. The Collision Kernel. *Astrophys. J.*, 2014, **797**, 101.
- Pan, L., Padoan, P. and Scalo, J., Turbulence-induced Relative Velocity of Dust Particles. II. The Bidisperse Case. *Astrophys. J.*, 2014a, **791**, 48.
- Pan, L., Padoan, P. and Scalo, J., Turbulence-induced Relative Velocity of Dust Particles. III. The Probability Distribution. *Astrophys. J.*, 2014b, **792**, 69.
- Park, K., Influence of initial conditions on the large-scale dynamo growth rate. *Month. Not. Roy. Astron. Soc.*, 2013a, **434**, 2020–2031.
- Park, K., Theory and Simulation of Magnetohydrodynamic Dynamos and Faraday Rotation for Plasmas of General Composition. Ph.D. Thesis, University of Rochester, 2013b.
- Park, K., Influence of small-scale  $E_M$  and  $H_M$  on the growth of large-scale magnetic field. *Month. Not. Roy. Astron. Soc.*, 2014a, **444**, 3837–3844.
- Park, K., Influence of small scale magnetic energy and helicity on the growth of large scale magnetic field. *arXiv:1403.1328*, 2014b.
- Park, K., Dynamo model for the inverse transfer of magnetic energy in a nonhelical decaying magnetohydrodynamic turbulence. *arXiv:1509.00788*, 2015.
- Park, K. and Blackman, E.G., Comparison between turbulent helical dynamo simulations and a non-linear three-scale theory. *Month. Not. Roy. Astron. Soc.*, 2012a, **419**, 913–924.
- Park, K. and Blackman, E.G., Simulations of a magnetic fluctuation driven large-scale dynamo and comparison with a two-scale model. *Month. Not. Roy. Astron. Soc.*, 2012b, **423**, 2120–2131.
- Park, K., Blackman, E.G. and Subramanian, K., Large-scale dynamo growth rates from numerical simulations and implications for mean-field theories. *Phys. Rev. E*, 2013, **87**, 053110.
- Park, K. and Park, D., Evolution of Kinetic and Magnetic Energy in Intra Cluster Media. *arXiv:1504.02940*, 2015.
- Park, K., Amplification of large scale magnetic fields in a decaying MHD system. *Phys. Rev. D*, 2017, **96**, 083505.
- Park, K., Negative Magnetic Diffusivity beta replacing alpha effect in Helical Dynamo, 2019a, arXiv:1911.01039.
- Park, K., Principle of the Helical and Nonhelical Dynamo and the  $\alpha$  Effect in a Field Structure Model. *Astrophys. J.*, 2019b, **872**, 132.
- Park, K., Negative Magnetic Diffusivity  $\beta$  Replacing the  $\alpha$  Effect in the Helical Dynamo. *Astrophys. J.*, 2020, **898**, 112.
- Park, K. and Cheoun, M.K., Negative Magnetic Diffusivity  $\beta$  effect in a Magnetically Dominant System. *arXiv e-prints*, 2021, arXiv:2102.03500.
- Park, K., Cheoun, M.K. and Kim, C.B., Turbulent Magnetic Diffusivity  $\beta$  Effect in a Magnetically Forced System. *Astrophys. J.*, 2023, **944**, 2.
- Pearson, B.R., Yousef, T.A., Haugen, N.E.L., Brandenburg, A. and Krogstad, P.Å., Delayed correlation between turbulent energy injection and dissipation. *Phys. Rev. E*, 2004, **70**, 056301.
- Pekkilä, J., Väisälä, M.S., Käpylä, M.J., Käpylä, P.J. and Anjum, O., Methods for compressible fluid simulation on GPUs using high-order finite differences. *Computer Physics Communications*, 2017, **217**, 11–22.
- Pekkilä, J., Väisälä, M.S., Käpylä, M.J., Rheinhardt, M. and Lappi, O., Scalable communication for high-order stencil computations using CUDA-aware MPI. *arXiv e-prints*, 2021, arXiv:2103.01597.
- Pencil Code Collaboration, The Pencil Code. , 2020, DOI:10.5281/zenodo.3961647.
- Pencil Code Collaboration, Brandenburg, A., Johansen, A., Bourdin, P., Dobler, W., Lyra, W., Rheinhardt, M., Bingert, S., Haugen, N., Mee, A., Gent, F., Babkovskaia, N., Yang, C.C., Heinemann, T., Dintrans, B., Mitra, D., Candelaresi, S., Warnecke, J., Käpylä, P., Schreiber, A., Chatterjee, P., Käpylä, M., Li, X.Y., Krüger, J., Aarnes, J., Sarson, G., Oishi, J., Schober, J., Plasson, R., Sandin, C., Karchniwy, E., Rodrigues, L., Hubbard, A., Guerrero, G., Snodin, A., Losada, I., Pekkilä, J. and Qian, C., The Pencil Code, a modular MPI code for partial differential equations and particles: multipurpose and multiuser-maintained. *J. Open Source Software*, 2021, **6**, 2807.
- Peng, J., Xu, J.X., Yang, Y. and Zhu, J.Z., Helicity hardens the gas, 2019, arXiv:1901.00423.
- Perri, B. and Brandenburg, A., Spontaneous flux concentrations from the negative effective magnetic pressure instability beneath a radiative stellar surface. *Astron. Astrophys.*, 2018, **609**, A99.
- Peter, H. and Bingert, S., Constant cross section of loops in the solar corona. *Astron. Astrophys.*, 2012, **548**, A1.
- Peter, H., Bingert, S. and Kamio, S., Catastrophic cooling and cessation of heating in the solar corona. *Astron. Astrophys.*, 2012, **537**, A152.
- Piontek, R.A., Gressel, O. and Ziegler, U., Multiphase ISM simulations: comparing NIRVANA and ZEUS. *Astron. Astrophys.*, 2009, **499**, 633–641.
- Porter, T.A., Jóhannesson, G. and Moskalenko, I.V., Deciphering Residual Emissions: Time-dependent Models for the Nonthermal Interstellar Radiation from the Milky Way. *Astrophys. J.*, 2019, **887**, 250.

- Porter, T.A., Jóhannesson, G. and Moskalenko, I.V., The GALPROP Cosmic-ray Propagation and Nonthermal Emissions Framework: Release v57. *Astrophys. J. Supp.*, 2022, **262**, 30.
- Prabhu, A.P., Singh, N.K., Käpylä, M.J. and Lagg, A., Inferring magnetic helicity spectrum in spherical domains: Method and example applications. *Astron. Astrophys.*, 2021, **654**, A3.
- Pusztai, I., Juno, J., Brandenburg, A., TenBarge, J.M., Hakim, A., Francisquez, M. and Sundström, A., Dynamo in weakly collisional non-magnetized plasmas impeded by Landau damping of magnetic fields. *Phys. Rev. Lett.*, 2020, **124**, arXiv:2001.11929.
- Qian, C., Wang, C., Liu, J., Brandenburg, A., Haugen, N.E.L. and Liberman, M.A., Convergence properties of detonation simulations. *Geophys. Astrophys. Fluid Dynam.*, 2020, **114**, 58–76.
- Rädler, K.H. and Brandenburg, A.,  $\alpha$ -effect dynamos with zero kinetic helicity. *Phys. Rev. E*, 2008, **77**, 026405.
- Rädler, K.H. and Brandenburg, A., Mean-field effects in the Galloway-Proctor flow. *Month. Not. Roy. Astron. Soc.*, 2009, **393**, 113–125.
- Rädler, K.H. and Brandenburg, A., Mean electromotive force proportional to mean flow in MHD turbulence. *Astron. Nachr.*, 2010, **331**, 14.
- Rädler, K.H., Brandenburg, A., Del Sordo, F. and Rheinhardt, M., Mean-field diffusivities in passive scalar and magnetic transport in irrotational flows. *Phys. Rev. E*, 2011, **84**, 046321.
- Raettig, N., Klahr, H. and Lyra, W., Particle Trapping and Streaming Instability in Vortices in Protoplanetary Disks. *Astrophys. J.*, 2015, **804**, 35.
- Raettig, N., Lyra, W. and Klahr, H., A Parameter Study for Baroclinic Vortex Amplification. *Astrophys. J.*, 2013, **765**, 115.
- Raettig, N., Lyra, W. and Klahr, H., Pebble Trapping in Vortices: Three-dimensional Simulations. *Astrophys. J.*, 2021, **913**, 92.
- Recchi, S., Chemodynamical Simulations of Dwarf Galaxy Evolution. *Adv. Astron.*, 2014, **2014**, 750754.
- Rein, H., A proposal for community driven and decentralized astronomical databases and the Open Exoplanet Catalogue. *arXiv:1211.7121*, 2012.
- Rempel, E.L., C-L Chian, A. and Brandenburg, A., Lagrangian chaos in an ABC-forced nonlinear dynamo. *Phys. Scr.*, 2012, **86**, 018405.
- Rempel, E.L., Chian, A.C.L., Beron-Vera, F.J., Szanyi, S. and Haller, G., Objective vortex detection in an astrophysical dynamo. *Month. Not. Roy. Astron. Soc.*, 2017, **466**, L108–L112.
- Rempel, E.L., Chian, A.C.L. and Brandenburg, A., Lagrangian Coherent Structures in Nonlinear Dynamos. *Astrophys. J. Lett.*, 2011, **735**, L9.
- Rempel, E.L., Chian, A.C.L., Brandenburg, A., Muñoz, P.R. and Shadden, S.C., Coherent structures and the saturation of a nonlinear dynamo. *J. Fluid Mech.*, 2013, **729**, 309–329.
- Rempel, E.L., Proctor, M.R.E. and Chian, A.C.L., A novel type of intermittency in a non-linear dynamo in a compressible flow. *Month. Not. Roy. Astron. Soc.*, 2009, **400**, 509–517.
- Rempel, E.L., Gomes, T.F.P., Silva, S.S.A. and Chian, A.C.L., Objective magnetic vortex detection. *Phys. Rev. E*, 2019, **99**, 043206.
- Reppin, J. and Banerjee, R., Nonhelical turbulence and the inverse transfer of energy: A parameter study. *Phys. Rev. E*, 2017, **96**, 053105.
- Rheinhardt, M. and Brandenburg, A., Test-field method for mean-field coefficients with MHD background. *Astron. Astrophys.*, 2010, **520**, A28.
- Rheinhardt, M. and Brandenburg, A., Modeling spatio-temporal nonlocality in mean-field dynamos. *Astron. Nachr.*, 2012, **333**, 71–77.
- Rheinhardt, M., Devlen, E., Rädler, K.H. and Brandenburg, A., Mean-field dynamo action from delayed transport. *Month. Not. Roy. Astron. Soc.*, 2014, **441**, 116–126.
- Rice, K. and Nayakshin, S., On fragmentation of turbulent self-gravitating discs in the long cooling time regime. *Month. Not. Roy. Astron. Soc.*, 2018, **475**, 921–931.
- Rice, W.K.M., Armitage, P.J., Mamatsashvili, G.R., Lodato, G. and Clarke, C.J., Stability of self-gravitating discs under irradiation. *Month. Not. Roy. Astron. Soc.*, 2011, **418**, 1356–1362.
- Rice, W.K.M., Forgan, D.H. and Armitage, P.J., Convergence of smoothed particle hydrodynamics simulations of self-gravitating accretion discs: sensitivity to the implementation of radiative cooling. *Month. Not. Roy. Astron. Soc.*, 2012, **420**, 1640–1647.
- Richert, A.J.W., Lyra, W., Boley, A., Mac Low, M.M. and Turner, N., On Shocks Driven by High-mass Planets in Radiatively Inefficient Disks. I. Two-dimensional Global Disk Simulations. *Astrophys. J.*, 2015, **804**, 95.
- Richert, A.J.W., Lyra, W. and Kuchner, M.J., The Interplay between Radiation Pressure and the Photoelectric Instability in Optically Thin Disks of Gas and Dust. *Astrophys. J.*, 2018, **856**, 41.
- Rieutord, M., The solar dynamo. *Comptes Rendus Physique*, 2008, **9**, 757–765.
- Rieutord, M., Magnetohydrodynamics and Solar Physics; in *SF2A-2014: Proc. Ann. Meeting French Soc. Astron. Astrophys.*, edited by J. Ballet, F. Martins, F. Bounaud, R. Monier and C. Reylé, Dec., 2014, pp. 45–50.
- Rodrigues, L.F.S., Sarson, G.R., Shukurov, A., Bushby, P.J. and Fletcher, A., The Parker Instability in Disk Galaxies. *Astrophys. J.*, 2016, **816**, 2.
- Rodrigues, L.F.S., Snodin, A.P., Sarson, G.R. and Shukurov, A., Fickian and non-Fickian diffusion of cosmic rays. *Month. Not. Roy. Astron. Soc.*, 2019, **487**, 975–980.

- Rogachevskii, I., Kleeorin, N., Brandenburg, A. and Eichler, D., Cosmic-Ray Current-driven Turbulence and Mean-field Dynamo Effect. *Astrophys. J.*, 2012, **753**, 6.
- Rogachevskii, I., Kleeorin, N., Käpylä, P.J. and Brandenburg, A., Pumping velocity in homogeneous helical turbulence with shear. *Phys. Rev. E*, 2011, **84**, 056314.
- Roper Pol, A., Gravitational radiation from MHD turbulence in the early universe. *arXiv e-prints*, 2021, arXiv:2105.08287.
- Roper Pol, A., Gravitational waves from MHD turbulence at the QCD phase transition as a source for Pulsar Timing Arrays. *arXiv e-prints*, 2022, arXiv:2205.09261.
- Roper Pol, A., Brandenburg, A., Kahniashvili, T., Kosowsky, A. and Mandal, S., The timestep constraint in solving the gravitational wave equations sourced by hydromagnetic turbulence. *Geophys. Astrophys. Fluid Dynam.*, 2020a, **114**, 130–161.
- Roper Pol, A., Caprini, C., Neronov, A. and Semikoz, D., The gravitational wave signal from primordial magnetic fields in the Pulsar Timing Array frequency band. *arXiv e-prints*, 2022a, arXiv:2201.05630.
- Roper Pol, A., Mandal, S., Brandenburg, A. and Kahniashvili, T., Polarization of gravitational waves from helical MHD turbulent sources. *J. Cosmol. Astropart. Phys.*, 2022b, **2022**, 019.
- Roper Pol, A., Mandal, S., Brandenburg, A., Kahniashvili, T. and Kosowsky, A., Numerical simulations of gravitational waves from early-universe turbulence. *Phys. Rev. D*, 2020b, **102**, 083512.
- Rosswog, S., A Simple, Entropy-based Dissipation Trigger for SPH. *Astrophys. J.*, 2020, **898**, 60.
- Rosswog, S., The Lagrangian hydrodynamics code MAGMA2., 2019, arXiv:1911.13093.
- Rovithis-Livaniou, E., Latest Results in the Field of Exoplanets. *Publ. l'Observatoire Astron. de Beograd*, 2010, **90**, 105–112.
- Rüdiger, G., Taylor-Couette flow: MRI, SHI and SRI. *astro-ph/0507313*, 2005.
- Rüdiger, G. and Brandenburg, A.,  $\alpha$  effect in a turbulent liquid-metal plane Couette flow. *Phys. Rev. E*, 2014, **89**, 033009.
- Rüdiger, G., Kitchatinov, L.L. and Brandenburg, A., Cross Helicity and Turbulent Magnetic Diffusivity in the Solar Convection Zone. *Sol. Phys.*, 2011, **269**, 3–12.
- Rüdiger, G., Küker, M., Käpylä, P. and Strassmeier, K.G., Antisolar differential rotation of slowly rotating cool stars., 2019, arXiv:1902.04172.
- Rüdiger, G., Küker, M. and Käpylä, P.J., Electrodynamics of turbulent fluids with fluctuating electric conductivity. *J. Plasma Phys.*, 2020, **86**, 905860318.
- Rüdiger, G., Gellert, M., Hollerbach, R., Schultz, M. and Stefani, F., Stability and instability of hydromagnetic Taylor-Couette flows. *Phys. Rep.*, 2018, **741**, 1–89.
- Ruoskanen, J., Harju, J., Juvela, M., Miettinen, O., Liljeström, A., Väisälä, M., Lunttila, T. and Kontinen, S., Mapping the prestellar core Ophiuchus D (L1696A) in ammonia. *Astron. Astrophys.*, 2011, **534**, A122.
- Ruszkowski, M., Enßlin, T.A., Brüggén, M., Begelman, M.C. and Churazov, E., Cosmic ray confinement in fossil cluster bubbles. *Month. Not. Roy. Astron. Soc.*, 2008, **383**, 1359–1365.
- Ruszkowski, M., Enßlin, T.A., Brüggén, M., Heinz, S. and Pfrommer, C., Impact of tangled magnetic fields on fossil radio bubbles. *Month. Not. Roy. Astron. Soc.*, 2007, **378**, 662–672.
- Ryu, C.M. and Huynh, C.T., Propagation and damping of Alfvén waves in low solar atmosphere. *Month. Not. Roy. Astron. Soc.*, 2017, **471**, 2237–2241.
- Sabelnikov, V.A., Lipatnikov, A.N., Nishiki, S., Dave, H.L., Hernández Pérez, F.E., Song, W. and Im, H.G., Dissipation and dilatation rates in premixed turbulent flames. *Phys. Fluids*, 2021, **33**, 035112.
- Santos-Lima, R., Guerrero, G., de Gouveia Dal Pino, E.M. and Lazarian, A., Diffusion of large-scale magnetic fields by reconnection in MHD turbulence. *Month. Not. Roy. Astron. Soc.*, 2021, **503**, 1290–1309.
- Sapetina, A., Ulyanichev, I. and Glinskiy, B., The grid codes generation for solving problems of the cosmic plasma hydrodynamics on supercomputers; in *J. Phys. Conf. Ser.*, Vol. 1336 of *J. Phys. Conf. Ser.*, Nov., 2019, p. 012012.
- Schad, A., Jouve, L., Duvall, T.L., Roth, M. and Vorontsov, S., Recent Developments in Helioseismic Analysis Methods and Solar Data Assimilation. *Space Sci. Ref.*, 2015, **196**, 221–249.
- Schaffer, N., Johansen, A. and Lambrechts, M., Streaming instability of multiple particle species. II. Numerical convergence with increasing particle number. *Astron. Astrophys.*, 2021, **653**, A14.
- Schaffer, N., Yang, C.C. and Johansen, A., Streaming instability of multiple particle species in protoplanetary disks. *Astron. Astrophys.*, 2018, **618**, A75.
- Scharmer, G.B., Nordlund, Å. and Heinemann, T., Convection and the Origin of Evershed Flows in Sunspot Penumbrae. *Astrophys. J. Lett.*, 2008, **677**, L149–L152.
- Schekochihin, A.A., Haugen, N.E.L., Brandenburg, A., Cowley, S.C., Maron, J.L. and McWilliams, J.C., The Onset of a Small-Scale Turbulent Dynamo at Low Magnetic Prandtl Numbers. *Astrophys. J. Lett.*, 2005, **625**, L115–L118.
- Schekochihin, A.A., Iskakov, A.B., Cowley, S.C., McWilliams, J.C., Proctor, M.R.E. and Yousef, T.A., Fluctuation dynamo and turbulent induction at low magnetic Prandtl numbers. *New J. Phys.*, 2007, **9**, 300.
- Schober, J., Brandenburg, A. and Rogachevskii, I., Chiral fermion asymmetry in high-energy plasma simulations. *Geophys. Astrophys. Fluid Dynam.*, 2020a, **114**, 106–129.
- Schober, J., Brandenburg, A., Rogachevskii, I. and Kleeorin, N., Energetics of turbulence generated by chiral MHD dynamos. *Geophys. Astrophys. Fluid Dynam.*, 2019, **113**, 107–130.

- Schober, J., Fujita, T. and Durrer, R., Generation of chiral asymmetry via helical magnetic fields. *Phys. Rev. D*, 2020b, **101**, 103028.
- Schober, J., Rogachevskii, I. and Brandenburg, A., Dynamo instabilities in plasmas with inhomogeneous chiral chemical potential. *Phys. Rev. D*, 2022a, **105**, 043507.
- Schober, J., Rogachevskii, I. and Brandenburg, A., Production of a Chiral Magnetic Anomaly with Emerging Turbulence and Mean-Field Dynamo Action. *Phys. Rev. Lett.*, 2022b, **128**, 065002.
- Schober, J., Rogachevskii, I., Brandenburg, A., Boyarsky, A., Fröhlich, J., Ruchayskiy, O. and Kleeorin, N., Laminar and Turbulent Dynamos in Chiral Magnetohydrodynamics. II. Simulations. *Astrophys. J.*, 2018, **858**, 124.
- Schreiber, A. and Klahr, H., Azimuthal and Vertical Streaming Instability at High Dust-to-gas Ratios and on the Scales of Planetesimal Formation. *Astrophys. J.*, 2018, **861**, 47.
- Sengupta, D. and Umurhan, O.M., Turbulence in Particle-laden Midplane Layers of Planet-forming Disks. *Astrophys. J.*, 2023, **942**, 74.
- Seta, A. and Beck, R., Revisiting the Equipartition Assumption in Star-Forming Galaxies. *Galaxies*, 2019, **7**, 45.
- Seta, A., Bushby, P.J., Shukurov, A. and Wood, T.S., Saturation mechanism of the fluctuation dynamo at  $\text{Pr}_M \geq 1$ . *Phys. Rev. Fluids*, 2020, **5**, 043702.
- Sharma, R., Mitra, D. and Oberoi, D., On the energization of charged particles by fast magnetic reconnection. *Month. Not. Roy. Astron. Soc.*, 2017, **470**, 723–731.
- Sharma, R. and Brandenburg, A., Low frequency tail of gravitational wave spectra from hydromagnetic turbulence. *Phys. Rev. D*, 2022, **106**, 103536.
- Shukurov, A., Sokoloff, D., Subramanian, K. and Brandenburg, A., Galactic dynamo and helicity losses through fountain flow. *Astron. Astrophys.*, 2006, **448**, L33–L36.
- Simon, J.B., Armitage, P.J., Li, R. and Youdin, A.N., The Mass and Size Distribution of Planetesimals Formed by the Streaming Instability. I. The Role of Self-gravity. *Astrophys. J.*, 2016, **822**, 55.
- Singh, N.K., Brandenburg, A., Chitre, S.M. and Rheinhardt, M., Properties of p and f modes in hydromagnetic turbulence. *Month. Not. Roy. Astron. Soc.*, 2015, **447**, 3708–3722.
- Singh, N.K., Brandenburg, A. and Rheinhardt, M., Fanning Out of the Solar f-mode in the Presence of Non-uniform Magnetic Fields?. *Astrophys. J. Lett.*, 2014, **795**, L8.
- Singh, N.K. and Jingade, N., Numerical Studies of Dynamo Action in a Turbulent Shear Flow. I. *Astrophys. J.*, 2015, **806**, 118.
- Singh, N.K., Raichur, H., Käpylä, M.J., Rheinhardt, M., Brandenburg, A. and Käpylä, P.J., f-mode strengthening from a localised bipolar subsurface magnetic field. *Geophys. Astrophys. Fluid Dynam.*, 2020, **114**, 196–212.
- Singh, N.K., Rogachevskii, I. and Brandenburg, A., Enhancement of Small-scale Turbulent Dynamo by Large-scale Shear. *Astrophys. J.*, 2017, **850**, L8.
- Skála, J., Baruffa, F., Büchner, J. and Rapp, M., The 3D MHD code GOEMHD3 for large-Reynolds-number astrophysical plasmas. *arXiv:1411.1289*, 2014.
- Skála, J., Baruffa, F., Büchner, J. and Rapp, M., The 3D MHD code GOEMHD3 for astrophysical plasmas with large Reynolds numbers. Code description, verification, and computational performance. *Astron. Astrophys.*, 2015, **580**, A48.
- Smiet, C.B., Candelaresi, S., Thompson, A., Swearingin, J., Dalhuisen, J.W. and Bouwmeester, D., Self-Organizing Knotted Magnetic Structures in Plasma. *Phys. Rev. Lett.*, 2015, **115**, 095001.
- Smiet, C.B., de Blank, H.J., de Jong, T.A., Kok, D.N.L. and Bouwmeester, D., Resistive evolution of toroidal field distributions and their relation to magnetic clouds. *J. Plasma Phys.*, 2019, **85**, 905850107.
- Smiet, C.B., Thompson, A., Bouwmeester, P. and Bouwmeester, D., Magnetic surface topology in decaying plasma knots. *New J. Phys.*, 2017, **19**, 023046.
- Snellman, J.E., Brandenburg, A., Käpylä, P.J. and Mantere, M.J., Verification of Reynolds stress parameterizations from simulations. *Astron. Nachr.*, 2012a, **333**, 78.
- Snellman, J.E., Käpylä, P.J., Käpylä, M.J., Rheinhardt, M. and Dintrans, B., Testing turbulent closure models with convection simulations. *Astronomische Nachrichten*, 2015, **336**, 32–52.
- Snellman, J.E., Käpylä, P.J., Korpi, M.J. and Liljeström, A.J., Reynolds stresses from hydrodynamic turbulence with shear and rotation. *Astron. Astrophys.*, 2009, **505**, 955–968.
- Snellman, J.E., Rheinhardt, M., Käpylä, P.J., Mantere, M.J. and Brandenburg, A., Mean-field closure parameters for passive scalar turbulence. *Phys. Scr.*, 2012b, **86**, 018406.
- Snodin, A.P., Brandenburg, A., Mee, A.J. and Shukurov, A., Simulating field-aligned diffusion of a cosmic ray gas. *Month. Not. Roy. Astron. Soc.*, 2006, **373**, 643–652.
- Stejko, A.M., Kosovichev, A.G., Featherstone, N.A., Guerrero, G., Hindman, B.W., Matilsky, L.I. and Warnecke, J., Constraining Global Solar Models through Helioseismic Analysis. *Astrophys. J.*, 2022, **934**, 161.
- Stone, J.M. and Gardiner, T.A., Implementation of the Shearing Box Approximation in Athena. *Astrophys. J. Supp.*, 2010, **189**, 142–155.
- Subramanian, K. and Brandenburg, A., Traces of large-scale dynamo action in the kinematic stage. *Month. Not. Roy. Astron. Soc.*, 2014, **445**, 2930–2940.
- Sur, S. and Brandenburg, A., The role of the Yoshizawa effect in the Archontis dynamo. *Month. Not. Roy. Astron. Soc.*, 2009, **399**, 273–280.



- Sur, S., Brandenburg, A. and Subramanian, K., Kinematic  $\alpha$ -effect in isotropic turbulence simulations. *Month. Not. Roy. Astron. Soc.*, 2008, **385**, L15–L19.
- Sur, S., Subramanian, K. and Brandenburg, A., Kinetic and magnetic  $\alpha$ -effects in non-linear dynamo theory. *Month. Not. Roy. Astron. Soc.*, 2007, **376**, 1238–1250.
- Surville, C., Mayer, L. and Lin, D.N.C., Dust Capture and Long-lived Density Enhancements Triggered by Vortices in 2D Protoplanetary Disks. *Astrophys. J.*, 2016, **831**, 82.
- Svedin, A., Cuéllar, M.C. and Brandenburg, A., Data assimilation for stratified convection. *Month. Not. Roy. Astron. Soc.*, 2013, **433**, 2278–2285.
- Tarjei Jensen, J., Haugen, N.E.L. and Babkovskaia, N., Calculation of the Minimum Ignition Energy based on the ignition delay time. *arXiv:1110.1163*, 2011.
- Tevzadze, A.G., Kisslinger, L., Brandenburg, A. and Kahniashvili, T., Magnetic Fields from QCD Phase Transitions. *Astrophys. J.*, 2012, **759**, 54.
- Tharakkal, D., Shukurov, A., Gent, F.A., Sarson, G.R., Snodin, A.P. and Rodrigues, L.F.S., Steady states of the Parker instability. *arXiv e-prints*, 2022, arXiv:2212.03215.
- Thévenin, F., Bigot, L., Kervella, P., Lopez, B., Pichon, B. and Schmider, F.X., Asteroseismology and interferometry. *Mem. Soc. Astr. Ital.*, 2006, **77**, 411.
- Threlfall, J., Bourdin, P.A., Neukirch, T. and Parnell, C.E., Particle dynamics in a non-flaring solar active region model. *Astron. Astrophys.*, 2016, **587**, A4.
- Tian, C. and Chen, Y., Numerical Simulations of Kelvin–Helmholtz Instability: A Two-dimensional Parametric Study. *Astrophys. J.*, 2016, **824**, 60.
- Tilgner, A. and Brandenburg, A., A growing dynamo from a saturated Roberts flow dynamo. *Month. Not. Roy. Astron. Soc.*, 2008, **391**, 1477–1481.
- Tricco, T.S., The Kelvin–Helmholtz instability and smoothed particle hydrodynamics. *Month. Not. Roy. Astron. Soc.*, 2019, **488**, 5210–5224.
- Trivedi, P., Reppin, J., Chluba, J. and Banerjee, R., Magnetic heating across the cosmological recombination era: results from 3D MHD simulations. *Month. Not. Roy. Astron. Soc.*, 2018, **481**, 3401–3422.
- Tschernitz, J. and Bourdin, P.A., Influence of the kinematic viscosity on solar convection simulations; in *44th COSPAR Scientific Assembly. Held 16–24 July*, Vol. 44, Jul., 2022, p. 2553.
- Turck-Chièze, S., Concluding remarks on solar and stellar activities and related planets; in *Solar and Stellar Variability: Impact on Earth and Planets*, edited by A.G. Kosovichev, A.H. Andrei and J.P. Rozelot, Vol. 264 of *IAU Symp.*, Feb., 2010, pp. 507–523.
- Turner, N.J., Fromang, S., Gammie, C., Klahr, H., Lesur, G., Wardle, M. and Bai, X.N., Transport and Accretion in Planet-Forming Disks. *Protostars and Planets VI*, 2014, pp. 411–432.
- Turner, N.J., Willacy, K., Bryden, G. and Yorke, H.W., Turbulent Mixing in the Outer Solar Nebula. *Astrophys. J.*, 2006, **639**, 1218–1226.
- Väisälä, M.S., Brandenburg, A., Mitra, D., Käpylä, P.J. and Mante, M.J., Quantifying the effect of turbulent magnetic diffusion on the growth rate of the magneto-rotational instability. *Astron. Astrophys.*, 2014, **567**, A139.
- Väisälä, M.S., Gent, F.A., Juvela, M. and Käpylä, M.J., The supernova-regulated ISM. IV. A comparison of simulated polarization with Planck observations (PENCIL CODE was used, but not explicitly mentioned). *Astron. Astrophys.*, 2018, **614**, A101.
- Väisälä, M.S., Pekkila, J., Käpylä, M.J., Rheinhardt, M., Shang, H. and Krasnopolsky, R., Interaction of Large- and Small-scale Dynamos in Isotropic Turbulent Flows from GPU-accelerated Simulations. *Astrophys. J.*, 2021, **907**, 83.
- van Wettum, T., Bingert, S. and Peter, H., Parameterisation of coronal heating: spatial distribution and observable consequences. *Astron. Astrophys.*, 2013, **554**, A39.
- Vermersch, V. and Brandenburg, A., Shear-driven magnetic buoyancy oscillations. *Astron. Nachr.*, 2009, **330**, 797.
- Viallet, M., Baraffe, I. and Walder, R., Towards a new generation of multi-dimensional stellar evolution models: development of an implicit hydrodynamic code. *Astron. Astrophys.*, 2011, **531**, A86.
- Viviani, M. and Käpylä, M.J., Physically motivated heat-conduction treatment in simulations of solar-like stars: effects on dynamo transitions. *Astron. Astrophys.*, 2021, **645**, A141.
- Viviani, M., Käpylä, M.J., Warnecke, J., Käpylä, P.J. and Rheinhardt, M., Stellar Dynamos in the Transition Regime: Multiple Dynamo Modes and Antisolar Differential Rotation. *Astrophys. J.*, 2019, **886**, 21.
- Viviani, M., Prabhu, A., Warnecke, J., Duarte, L., Pekkila, J., Rheinhardt, M. and Käpylä, M.J., Hunting down the cause of solar magnetism. *arXiv e-prints*, 2021, arXiv:2102.03168.
- Viviani, M., Warnecke, J., Käpylä, M.J., Käpylä, P.J., Olsper, N., Cole-Kodikara, E.M., Lehtinen, J.J. and Brandenburg, A., Transition from axi- to nonaxisymmetric dynamo modes in spherical convection models of solar-like stars. *Astron. Astrophys.*, 2018, **616**, A160.
- Vshivkov, V.A., Lazareva, G.G., Snytnikov, A.V., Kulikov, I.M. and Tutukov, A.V., Hydrodynamical Code for Numerical Simulation of the Gas Components of Colliding Galaxies. *Astrophys. J. Supp.*, 2011, **194**, 47.
- Warnecke, J., Dynamo cycles in global convection simulations of solar-like stars. *Astron. Astrophys.*, 2018, **616**, A72.
- Warnecke, J. and Brandenburg, A., Surface appearance of dynamo-generated large-scale fields. *Astron. Astrophys.*, 2010, **523**, A19.

- Warnecke, J. and Brandenburg, A., Dynamo generated field emergence through recurrent plasmoid ejections; in *IAU Symp.*, edited by D. Prasad Choudhary and K.G. Strassmeier, Vol. 273 of *IAU Symp.*, Aug., 2011a, pp. 256–260.
- Warnecke, J. and Brandenburg, A., Recurrent flux emergence from dynamo-generated fields; in *IAU Symp.*, edited by N.H. Brummell, A.S. Brun, M.S. Miesch and Y. Ponty, Vol. 271 of *IAU Symp.*, Aug., 2011b, pp. 407–408.
- Warnecke, J. and Brandenburg, A., Coronal influence on dynamos; in *IAU Symp.*, Vol. 302 of *IAU Symp.*, Aug., 2014, pp. 134–137.
- Warnecke, J., Brandenburg, A. and Mitra, D., Dynamo-driven plasmoid ejections above a spherical surface. *Astron. Astrophys.*, 2011a, **534**, A11.
- Warnecke, J., Brandenburg, A. and Mitra, D., Plasmoid ejections driven by dynamo action underneath a spherical surface; in *IAU Symp.*, edited by A. Bonanno, E. de Gouveia Dal Pino and A.G. Kosovichev, Vol. 274 of *IAU Symp.*, Jun., 2011b, pp. 306–309.
- Warnecke, J., Brandenburg, A., Mitra, D.A. and ), Magnetic twist: a source and property of space weather. *J. Space Weather Space Climate*, 2012a, **2**, A11.
- Warnecke, J., Käpylä, P.J., Käpylä, M.J. and Brandenburg, A., On The Cause of Solar-like Equatorward Migration in Global Convective Dynamo Simulations. *Astrophys. J. Lett.*, 2014, **796**, L12.
- Warnecke, J., Käpylä, P.J., Mantere, M.J. and Brandenburg, A., Coronal ejections from convective spherical shell dynamos; in *IAU Symp.*, edited by C.H. Mandrini and D.F. Webb, Vol. 286 of *IAU Symp.*, Jul., 2012b, pp. 154–158.
- Warnecke, J., Käpylä, P.J., Mantere, M.J. and Brandenburg, A., Ejections of Magnetic Structures Above a Spherical Wedge Driven by a Convective Dynamo with Differential Rotation. *Sol. Phys.*, 2012c, **280**, 299–319.
- Warnecke, J., Käpylä, P.J., Mantere, M.J. and Brandenburg, A., Solar-like differential rotation and equatorward migration in a convective dynamo with a coronal envelope; in *IAU Symp.*, edited by A.G. Kosovichev, E. de Gouveia Dal Pino and Y. Yan, Vol. 294 of *IAU Symp.*, Jul., 2013a, pp. 307–312.
- Warnecke, J., Käpylä, P.J., Mantere, M.J. and Brandenburg, A., Spoke-like Differential Rotation in a Convective Dynamo with a Coronal Envelope. *Astrophys. J.*, 2013b, **778**, 141.
- Warnecke, J., Losada, I.R., Brandenburg, A., Kleerorin, N. and Rogachevskii, I., Bipolar Magnetic Structures Driven by Stratified Turbulence with a Coronal Envelope. *Astrophys. J. Lett.*, 2013c, **777**, L37.
- Warnecke, J., Losada, I.R., Brandenburg, A., Kleerorin, N. and Rogachevskii, I., Bipolar region formation in stratified two-layer turbulence. *Astron. Astrophys.*, 2016, **589**, A125.
- Warnecke, J. and Peter, H., Data-driven model of the solar corona above an active region. *Astron. Astrophys.*, 2019a, **624**, L12.
- Warnecke, J., Rheinhardt, M., Tuomisto, S., Käpylä, P.J., Käpylä, M.J. and Brandenburg, A., Turbulent transport coefficients in spherical wedge dynamo simulations of solar-like stars. *Astron. Astrophys.*, 2018, **609**, A51.
- Warnecke, J. and Bingert, S., Non-Fourier description of heat flux evolution in 3D MHD simulations of the solar corona. *Geophys. Astrophys. Fluid Dynam.*, 2020, **114**, 261–281.
- Warnecke, J. and Peter, H., On the influence of magnetic helicity on X-rays emission of solar and stellar coronae. , 2019b, arXiv:1910.06896.
- Warnecke, J., Rheinhardt, M., Viviani, M., Gent, F.A., Tuomisto, S. and Käpylä, M.J., Investigating Global Convective Dynamos with Mean-field Models: Full Spectrum of Turbulent Effects Required. *Astrophys. J. Lett.*, 2021, **919**, L13.
- Willamo, T., Hackman, T., Lehtinen, J.J., Käpylä, M.J., Olsper, N., Viviani, M. and Warnecke, J., Shapes of stellar activity cycles. *Astron. Astrophys.*, 2020, **638**, A69.
- Workman, J.C. and Armitage, P.J., Interaction of the Magnetorotational Instability with Hydrodynamic Turbulence in Accretion Disks. *Astrophys. J.*, 2008, **685**, 406–417.
- Yamamoto, S. and Makino, J., A formulation of consistent particle hydrodynamics in strong form. *Pub. Astron. Soc. Japan*, 2017, **69**, 35.
- Yang, C.C. and Johansen, A., Large-scale planetesimal formation by streaming instability; in *Exploring the Formation and Evolution of Planetary Systems*, edited by M. Booth, B.C. Matthews and J.R. Graham, Vol. 299 of *IAU Symp.*, Jan., 2014a, pp. 177–178.
- Yang, C.C. and Johansen, A., On the Feeding Zone of Planetesimal Formation by the Streaming Instability. *Astrophys. J.*, 2014b, **792**, 86.
- Yang, C.C. and Johansen, A., Integration of Particle-gas Systems with Stiff Mutual Drag Interaction. *Astrophys. J. Supp.*, 2016, **224**, 39.
- Yang, C.C., Johansen, A. and Carrera, D., Concentrating small particles in protoplanetary disks through the streaming instability. *Astron. Astrophys.*, 2017, **606**, A80.
- Yang, C.C. and Krumholz, M., Thermal-instability-driven Turbulent Mixing in Galactic Disks. I. Effective Mixing of Metals. *Astrophys. J.*, 2012, **758**, 48.
- Yang, C.C., Mac Low, M.M. and Menou, K., Planetesimal and Protoplanet Dynamics in a Turbulent Protoplanetary Disk: Ideal Unstratified Disks. *Astrophys. J.*, 2009, **707**, 1233–1246.
- Yang, C.C., Mac Low, M.M. and Menou, K., Planetesimal and Protoplanet Dynamics in a Turbulent Protoplanetary Disk: Ideal Stratified Disks. *Astrophys. J.*, 2012, **748**, 79.
- Yang, C.C., Mac Low, M.M. and Johansen, A., Diffusion and Concentration of Solids in the Dead Zone of a Protoplanetary Disk. *Astrophys. J.*, 2018, **868**, 27.
- Yang, C.C. and Zhu, Z., Morphological signatures induced by dust back reaction in discs with an embedded planet. *Month. Not. Roy. Astron. Soc.*, 2020, **491**, 4702–4718.

- Yang, C.C. and Zhu, Z., Streaming instability with multiple dust species - II. Turbulence and dust-gas dynamics at non-linear saturation. *Month. Not. Roy. Astron. Soc.*, 2021, **508**, 5538–5553.
- Yang, Y. and Zhu, J.Z., Turbulence compressibility reduction with helicity. *Phys. Fluids*, 2022, **34**, 045113.
- Yokoi, N. and Brandenburg, A., Large-scale flow generation by inhomogeneous helicity. *Phys. Rev. E*, 2016, **93**, 033125.
- Youdin, A. and Johansen, A., Protoplanetary Disk Turbulence Driven by the Streaming Instability: Linear Evolution and Numerical Methods. *Astrophys. J.*, 2007, **662**, 613–626.
- Youdin, A.N. and Johansen, A., Planetesimal Formation with Particle Feedback; in *Extreme Solar Systems*, edited by D. Fischer, F.A. Rasio, S.E. Thorsett and A. Wolszczan, Vol. 398 of *Astron. Soc. Pac. Conf. Ser.*, 2008, p. 219.
- Yousef, T.A. and Brandenburg, A., Relaxation of writhe and twist of a bi-helical magnetic field. *Astron. Astrophys.*, 2003, **407**, 7–12.
- Yousef, T.A., Brandenburg, A. and Rüdiger, G., Turbulent magnetic Prandtl number and magnetic diffusivity quenching from simulations. *Astron. Astrophys.*, 2003, **411**, 321–327.
- Yousef, T.A., Haugen, N.E.L. and Brandenburg, A., Self-similar scaling in decaying numerical turbulence. *Phys. Rev. E*, 2004, **69**, 056303.
- Yousef, T.A., Heinemann, T., Schekochihin, A.A., Kleeorin, N., Rogachevskii, I., Iskakov, A.B., Cowley, S.C. and McWilliams, J.C., Generation of Magnetic Field by Combined Action of Turbulence and Shear. *Phys. Rev. Lett.*, 2008, **100**, 184501.
- Yuvraj, Naderzadeh Ardebili, Y., Song, W., Im, H.G., Law, C.K. and Chaudhuri, S., On flame speed enhancement in turbulent premixed hydrogen-air flames during local flame-flame interaction. *arXiv e-prints*, 2023, arXiv:2303.00911.
- Zacharias, P., Bingert, S. and Peter, H., Doppler shifts in the transition region and corona. Mass cycle between the chromosphere and the corona. *Mem. Soc. Astr. Ital.*, 2009a, **80**, 654.
- Zacharias, P., Bingert, S. and Peter, H., Spectral analysis of 3D MHD models of coronal structures. *Adv. Space Res.*, 2009b, **43**, 1451–1456.
- Zacharias, P., Peter, H. and Bingert, S., Ejection of cool plasma into the hot corona. *Astron. Astrophys.*, 2011a, **532**, A112.
- Zacharias, P., Peter, H. and Bingert, S., Investigation of mass flows in the transition region and corona in a three-dimensional numerical model approach. *Astron. Astrophys.*, 2011b, **531**, A97.
- Zhang, B., Sorathia, K.A., Lyon, J.G., Merkin, V.G., Garretson, J.S. and Wiltberger, M., GAMERA: A three-dimensional finite-volume MHD solver for non-orthogonal curvilinear geometries, 2018a, arXiv:1810.10861.
- Zhang, H., Luo, K., Haugen, N.E.L., Mao, C. and Fan, J., Drag force for a burning particle. *Comb. Flame*, 2020, **217**, 188–199.
- Zhang, H. and Yan, H., Polarization of submillimetre lines from interstellar medium. *Month. Not. Roy. Astron. Soc.*, 2018, **475**, 2415–2420.
- Zhang, H., Yan, H. and Richter, P., The influence of atomic alignment on absorption and emission spectroscopy. *Month. Not. Roy. Astron. Soc.*, 2018b, **479**, 3923–3935.
- Zhang, J., Hou, Y., Fang, Y., Chen, F., Li, T., Yan, X., Ding, T., Song, Z., Xiang, Y. and Liu, Z., Propagating and Stationary Bright Knots in the Quiet Sun. *Astrophys. J. Lett.*, 2023, **942**, L2.
- Zhou, H. and Blackman, E., Helical dynamo growth at modest versus extreme magnetic Reynolds numbers. *arXiv e-prints*, 2023, arXiv:2302.06042.
- Zhou, H. and Blackman, E.G., On the shear-current effect: toward understanding why theories and simulations have mutually and separately conflicted. *Month. Not. Roy. Astron. Soc.*, 2021, **507**, 5732–5746.
- Zhou, H., Sharma, R. and Brandenburg, A., Scaling of the Hosking integral in decaying magnetically dominated turbulence. *J. Plasma Phys.*, 2022, **88**, 905880602.
- Zhu, J.Z., Real Schur flow computations, helicity fastening effects and Bagua-pattern cyclones. *Phys. Fluids*, 2021, **33**, 107112.
- Zhu, Z. and Yang, C.C., Streaming instability with multiple dust species - I. Favourable conditions for the linear growth. *Month. Not. Roy. Astron. Soc.*, 2021, **501**, 467–482.
- Zhuleku, J., Warnecke, J. and Peter, H., Stellar X-rays and magnetic activity in 3D MHD coronal models. *Astron. Astrophys.*, 2021, **652**, A32.
- Ziegler, U., A semi-discrete central scheme for magnetohydrodynamics on orthogonal-curvilinear grids. *J. Comp. Phys.*, 2011, **230**, 1035–1063.