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/
September 25, 2022

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.

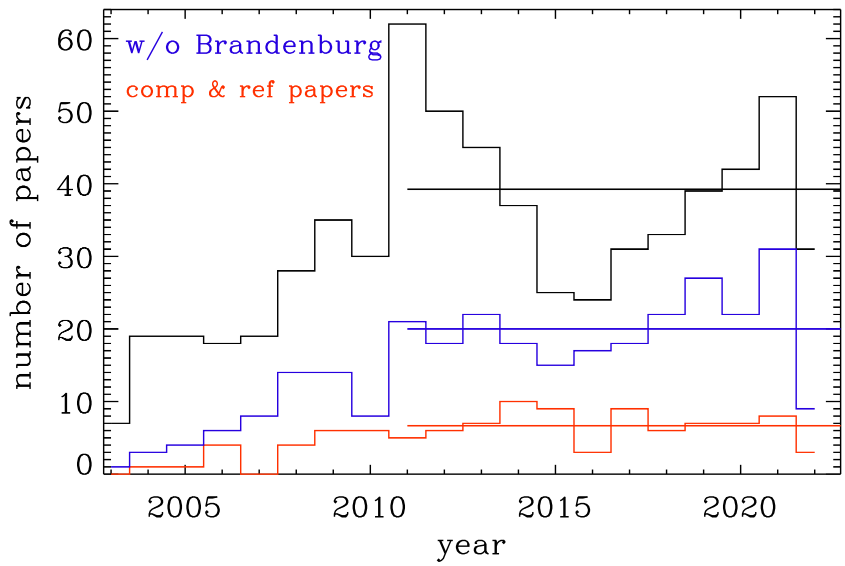

Figure 1: Number of papers since 2003 that make use of the Pencil Code. In red is shown the number of papers that reference it for code comparison or other purposes and in blue the papers that are not co-authored by Brandenburg. The enhanced number of papers during 2011–2013 results from publications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

1 Papers by year

As of July 2022, the Pencil Code *has been used for a total of 646 research papers; see Figure 1; 298 of those are papers (46%) are not co-authored by Brandenburg. In addition, 102 papers reference it for code comparison or other purposes (see the red line).*

31 times in 2022 (Tschernitz and Bourdin, 2022; Becerra *et al.*, 2022a; Brandenburg *et al.*, 2022a; Li *et al.*, 2022; Käpylä, 2022b; Carenza *et al.*, 2022; Brandenburg *et al.*, 2022b; Käpylä and

Singh, 2022; Brandenburg, 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, 2022a; Kirchschlager *et al.*, 2022; Bhat, 2022; Roper Pol *et al.*, 2022a; Mattsson and Hedvall, 2022; Karchniwy *et al.*, 2022),

52 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; Schober *et al.*, 2021a,b; 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),

42 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; Jakab and Brandenburg, 2020; Li and Mattsson, 2020; Adrover-González and Terradas, 2020; Brandenburg and Brüggen, 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 Nättilä, 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; Käpylä *et al.*, 2010a,b,c,d; Baggaley *et al.*, 2010; Brandenburg and Dobler, 2010; Guerrero *et al.*, 2010; Chatterjee *et al.*, 2010; Rädler 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; Børve *et al.*, 2009; Vermersch and Brandenburg, 2009; Heinemann and Papaloizou, 2009; Käpylä 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; Käpylä *et al.*, 2009a,b,c; Liljeström *et al.*, 2009; Lyra *et al.*, 2009a,b; Hubbard and Brandenburg, 2009; Sur and Brandenburg, 2009; Hubbard *et al.*, 2009; Rädler 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; Käpylä 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; Rädler and Brandenburg, 2008; Tilgner and Brandenburg, 2008; Sur *et al.*, 2008; Käpylä *et al.*, 2008; Youdin and Johansen, 2008; Green *et al.*, 2008; Brandenburg *et al.*, 2008a,b,c; Brandenburg, 2008a,b),

19 times in 2007 (Käpylä and Brandenburg, 2007; Fromang *et al.*, 2007; Fromang and Papaloizou, 2007; Oishi *et al.*, 2007; Heinemann *et al.*, 2007; Brandenburg and Käpylä, 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 Rüdiger, 2005; Brandenburg and Blackman, 2005; Brandenburg and Käpylä, 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* (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 Brüggen, 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* (Brandenburg *et al.*, 2022a; 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.*, 2022; Bhat *et al.*, 2021; Brandenburg, 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* (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; Kahniashvili *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* (Li *et al.*, 2022; Kirchschlager *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* (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* (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* (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, 2022a, 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* (Käpylä, 2022b; 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* (Carenza *et al.*, 2022; 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* (Schober *et al.*, 2021a,b, 2020a,b, 2019, 2018; Brandenburg *et al.*, 2017e).

(d) *Hydrodynamic and MHD turbulence* (Brandenburg *et al.*, 2022b; 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* (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, 2022, 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 (Paardekooper *et al.*, 2022; Chouliaras and Gourgouliatos, 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-Livaniou, 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).

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