

Abstract Submitted  
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**A knotted complex scalar field for any knot**<sup>1</sup> BENJAMIN BODE, MARK DENNIS, University of Bristol — Three-dimensional field configurations where a privileged defect line is knotted or linked have experienced an upsurge in interest, with examples including fluid mechanics [1], quantum wavefunctions, optics [2], liquid crystals [3] and skyrmions [4]. We describe a constructive algorithm to write down complex scalar functions of three-dimensional real space with knotted nodal lines, using trigonometric parametrizations of braids. The construction is most natural for the family of lemniscate knots which generalizes the torus knot and figure-8 knot [5], but generalizes to any knot or link. The specific forms of these functions allow various topological quantities associated with the field to be chosen, such as the helicity of a knotted flow field. We will describe some applications to physical systems such as those listed above. [1] H Moffatt, *J Fluid Mech* 35, 117-129 (1969) [2] M R Dennis et al, *Nature Physics* 6, 118-121 (2010) [3] T Machon and G Alexander, *Phys Rev Lett* 113, 027801 (2014) [4] P Sutcliffe, *Proc R Soc A* 463, 3001-3020 (2007) [5] B Bode, M R Dennis et al, arXiv:1611.02563 (2016)

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