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The fractional quantum Hall effect: The cases of 5/2 and 12/5
KESHAV SHRIVASTAVA, University of Malaya — We find that there is a state of zero energy because of a zero value in (1/2)g. When negative sign is used, L=0, S=1/2, g=(2J+1)/(2L+1)=[2(L-S)+1]/[2L+1]=0 so that [n+(1/2)][(1/2)g]=0. For positive sign, L+S, L=0, g=2 so that [n+(1/2)][(1/2)g]=5/2 for n=2. Hence 0 and 5/2 become particle-hole conjugates. In this definition, the sign of the spin for the particle is different from that for the hole as required by the helicity, p.s. For negative sign, L=2, (1/2)g=2/5 and (n-n')[(1/2)g]=12/5 with n-n'=6. For the positive sign, (1/2)g=3/5 for L=2 and for n-n"=4, we get 12/5. Thus 12/5 can arise for up spin as well as for down spin for different Landau levels[1]. On the basis of a product of [n+(1/2)][(1/2)g] we are able to understand all of the fractions given by Pan et al[2]. [1] K. N. Shrivastava, Phys. Lett. A 113,435(1986); A326,469(2004); Mod. Phys. Lett. 13,1087(1999); 14,1009(2000); AIP Conf. Proc. 909, 43-49(2007); 909.50-56(2007);1017, 422-428(2008);1017,326-330(2008); 1017, 47-56(2008), Proc. SPIE(USA)7155,71552F1-8[7155_86](2008). [2] Wei Pan et al, Phys. Rev. B 77, 075307(2008).

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