

Photon-axion conversion cross-sections in an electromagnetic field

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Abstract: Photon-axion conversions in static magnetic fields and in a periodic field with frequency equal to the axion mass are considered in detail by the Feynman diagram methods. The differential cross-sections are presented and numerical evaluations are given. It is shown that there is a resonant conversion for the considered process. Some estimates for experimental conditions are given from our results.

Index Keywords: analytic method; article; electromagnetic field; evaluation; magnetic field; mathematical analysis; mathematical computing; mathematical model; photon; process design

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References:

1. Peccei, R.D., Quinn, H., (1977) Phys. Rev. Lett., 38, p. 1440
2. (1977) Phys. Rev., D16, p. 1792
3. Weinberg, S., (1977) Phys. Rev. Lett., 40, p. 223
4. Wilczek, F., (1977) Phys. Rev. Lett., 40, p. 279
5. Kim, J.E., (1987) Phys. Rep., 150, p. 1
6. Cheng, H.Y., (1988) Phys. Rep., 158, p. 1
7. Peccei, R.D., (1989) CP Violation, 3. , ed. C. Jarlskog, Advanced Series on Directions in High Energy Physics, (World

Scientific, Singapore)

8. Turner, M.S., (1990) Phys. Rep., 197, p. 67
9. Raffelt, G.G., (1990) Phys. Rep., 198, p. 1
10. Kolb, E.W., Turner, M.S., (1990) The Early Universe, , Addison-Wesley
11. Kim, J.E., (1984) Phys. Lett., B136, p. 387
12. Kim, J.E., Nilles, H.P., (1984) Phys. Lett., 138, p. 150
13. Rajagopal, K., Turner, M.S., Wilczek, F., (1991) Nucl. Phys., B358, p. 447
14. Vysotsky, M.I., Voloshin, M.B., (1986) Yad. Fiz., 44, p. 845
15. Voloshin, M.B., Vysotsky, M.I., Okun, L.B., (1986) Zh. Eksp. Teor. Fiz., 91, p. 745. , Sov. Phys. JETP 64, 446 (1986)
16. Kim, J.E., Masiero, A., Nanopoulos, D.V., (1984) Phys. Lett., B139, p. 346
17. Sikivie, P., (1983) Phys. Rev. Lett., 51, p. 1415
18. (1985) Phys. Rev., D32, p. 2988
19. Van Bibber, K., Dagdeviren, N.R., Koonin, S.E., Kerman, A.K., Nelson, H.N., (1987) Phys. Rev. Lett., 59, p. 759
20. Van Bibber, K., McIntyre, P.M., Morris, D.E., Raffelt, G.G., (1989) Phys. Rev., D39, p. 2089
21. DePanfilis, S., Melissinos, A.C., Moskowitz, B.E., Rogers, J.T., Semertzidis, Y.K., Wuensch, W.U., Halama, H.J., Nezhick, F.A., (1987) Phys. Rev. Lett., 59, p. 839
22. Hagman, C., Sikivie, P., Sullivan, N.S., Tanner, D.B., (1990) Phys. Rev., D42, p. 1297
23. Guiderdoni, B., Greene, G., Hinds, D., Tran Thanh Van, J., (1995) Dark Matter in Cosmology Clocks and Test of Fundamental Laws, , Editions Frontieres, France
24. Moriyama, S., Minowa, M., Namba, T., Inoue, Y., Takasu, Y., Yamamoto, A., (1998) Phys. Lett., B434, p. 147
25. Minowa, M., Moriyama, S., Inoue, Y., Namba, T., Takasu, Y., Yamamoto, A., (1999) Nucl. Phys., B72, p. 171
26. Dine, M., Fischler, W., Srednicki, M., (1981) Phys. Lett., B104, p. 199
27. Zhitnitskii, A.P., (1980) Yad. Fiz., 31, p. 497. , Sov. J. Nucl. Phys. 31, 260 (1980)
28. Kim, J.E., (1977) Phys. Rev. Lett., 40, p. 223
29. Shifman, M.A., Vainshtein, A.I., Zakharov, V.I., (1980) Nucl. Phys., B166, p. 493
30. Jackson, J.D., (1975) Classical Electrodynamics, p. 247. , Wiley, New York, Sec. 8.4
31. Long, H.N., Soa, D.V., Tran, T.A., (1994) Mod. Phys. Lett., A9, p. 3619

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