

**Zeitschrift:** Helvetica Physica Acta  
**Band:** 59 (1986)  
**Heft:** 4

**Artikel:** Spin waves in polarized quantum fluids  
**Autor:** Leduc, Michèle  
**DOI:** <https://doi.org/10.5169/seals-115745>

### **Nutzungsbedingungen**

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. [Siehe Rechtliche Hinweise.](#)

### **Conditions d'utilisation**

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. [Voir Informations légales.](#)

### **Terms of use**

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. [See Legal notice.](#)

**Download PDF:** 16.05.2025

**ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>**

SPIN WAVES IN POLARIZED QUANTUM FLUIDS

Michèle LEDUC

Laboratoire de Spectroscopie Hertzienne de l'E.N.S.  
24, rue Lhomond - F-75231 Paris Cedex 05 - France

Spin polarized gases such as  $H\downarrow$  and  ${}^3\text{He}\uparrow$  exhibit a number of interesting quantum properties at low temperature. The polarization of the nuclear spin induces significant changes in the transport properties of the gas. In particular the spin diffusion can become oscillatory and give rise to (damped) spin waves [1]. These waves are consequences of the particle indistinguishability principle and result from the so-called "identical spin rotation effect" during collisions. Ab initio calculations of these phenomenon were done [2] [3] and the agreement is good with experiments performed recently on  $H\downarrow$  [4], [5], [6], on  ${}^3\text{He}\uparrow$  gas [7] [8] and in dilute solutions of  ${}^3\text{He}$  in superfluid  ${}^4\text{He}$  [9]. At the same time appeared also some results on spin waves in liquid pure  ${}^3\text{He}\uparrow$  [10] and  ${}^3\text{He} - {}^4\text{He}$  liquid mixtures [11].

REFERENCES

- [1] Physics Today, June 1984, p.84.
- [2] C. Lhuillier and F. Laloë, Journ. de Physique 43 (1982) 197 and 225.
- [3] C. Lhuillier, Journal de Physique 44 (1983) 1.
- [4] B.R. Johnson, J.S. Denker, N. Bigelow, L.P. Lévy, J.H. Freed, D.M. Lee, Phys. Rev. Lett. 52 (1984) 1508.
- [5] L.P. Lévy, A.E. Rückenstein, Phys. Rev. Lett. 52 (1984) 1512.
- [6] T.O. Niinikoski, private communication.
- [7] P.J. Nacher, G. Tastevin, M. Leduc, S.B. Crampton and F. Laloë, Journal de Phys. Lett. 45 (1984) L-441.
- [8] G. Tastevin, P.J. Nacher, M. Leduc and F. Laloë, Journal de Phys. Lett. 46 (1985) L-249.
- [9] W.J. Gully, W.J. Mullin, Phys. Rev. Lett. 52 (1984) 1810.
- [10] N. Masuhara, D. Candela, D.O. Edwards, R.F. Hoyt, H.N. Scholz, D.S. Sherrill and R. Combescot, Phys. Rev. Lett. 53 (1984) 1168.
- [11] J.R. Owers-Bradley, H. Chocolacs, R.M. Müller, Ch. Buchal, M. Kubota, F. Pobell, Phys. Rev. Lett. 51 (1983) 2120.