where $|0\rangle$ is the vacuum state and $a_j^\dagger$ creates a particle in the orbital j with time-reversal properties $\tau a_{jm}^\dagger \tau^{-1} = (-1)^{j+m} a_{j-m}^\dagger$. The amplitudes α_j are determined by the secular equation

$$(2\varepsilon_j - E)\alpha_j = \sum_{j'} (j+\tfrac{1}{2})^{\frac{1}{2}} (j'+\tfrac{1}{2})^{\frac{1}{2}} G(j',j',j,j)\,\alpha_{j'}\,, \tag{1.2}$$

Fig. 2.B.1

single-particle energy associated with the j-orbital. If we re-
tegrals (*) $G(j',j',j,j)$ by an average value G, the eigenvalues E
e dispersion relation

$$\frac{1}{G} = \sum_j \frac{j+\frac{1}{2}}{2\varepsilon_j - E} = \sum_j \sum_{m>0} \frac{1}{2\varepsilon_j - E} = F(E)\,.$$

The nature of the solution is illustrated in fig. 1. When E goes from a value smaller to a value larger than $2\varepsilon_j$, $F(E)$ decreases from ∞ to $-\infty$. As E passes through the origin to negative values, $F(E)$ decreases from ∞ to zero. The eigenvalues E are given by the intersection of $F(E)$ with the line $F(E) = G^{-1}$.

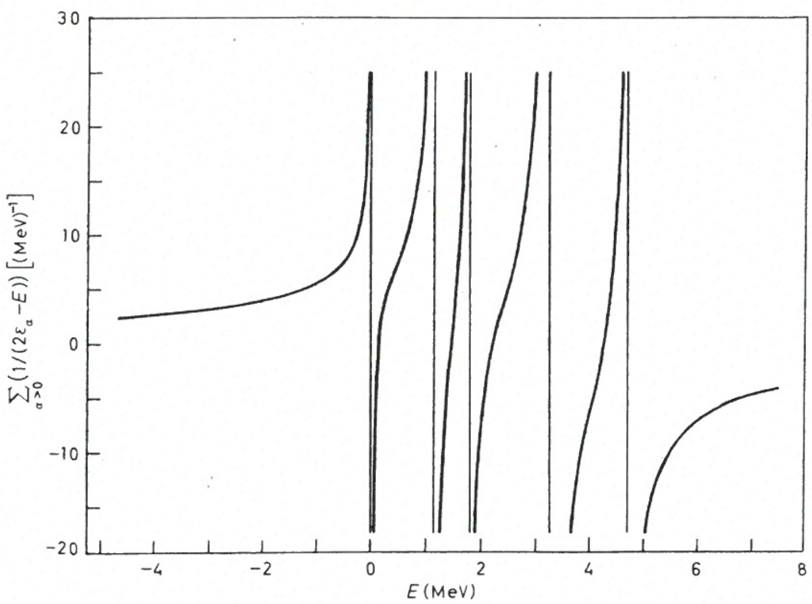

Fig. 1. – Dispersion relation (1.3) for ^{206}Pb. The single-hole states available to the two neutrons are $p_{1/2}(0)$, $f_{5/2}(0.57)$, $p_{3/2}(0.89)$, $i_{13/2}(1.63)$, $f_{7/2}(2.34)$ (from ref. [12]). The label α denotes the quantum numbers (j, m).

(*) For a contact interaction, $G(j',j',j,j) = -(V_0/4\pi)\int u_{j'}^{*2}(r)\,u_j^2(r)\,r^2\,dr$.