PHY 491 - QUIZ 6

October 21, 211

In 2-dimensions the density of single particle states is given by

 $D\left(ε\right)dε=\frac{A}{\left(2π\right)^{2}}2.2πkdk=\frac{A}{π}k\frac{dk}{dε}dε$

What is $D(ϵ)$ for

1. Nonrelativistic electrons $ε\left(k\right)=\frac{ℏ^{2}}{2m}k^{2}$

where $m$ is the mass

$$D\left(ε\right)=\frac{A}{π}\frac{m}{ℏ^{2}}$$

1. Massless relativistic fermions

 $ε\left(k\right)=ℏvk$

where $v$ is the velocity.

$$D\left(ε\right)=\frac{A}{π}\frac{ε}{\left(ℏv\right)^{2}}$$