and centered at the origin, which is complete except for a small angle around $|\arg z|=\pi$ gives zero (see reference 14, p. 219). This shows that

$$-\frac{1}{2\pi i}\int_{-\infty}^{(0+)} P(z)dz=\frac{4\sinh(\pi\gamma)}{3\pi\gamma}F(a,\gamma)-\frac{4}{3}\frac{\sinh(\pi\gamma)}{\pi\gamma}. \quad \text{(A4)}$$

The integral on the left can be performed directly. We get

$$F(a,\gamma)=\frac{3\pi}{4a}\coth(\pi\gamma)+\frac{3\pi}{4a^3}\left(1+\frac{1}{4\gamma^2}\right)\coth(\pi\gamma)$$

$$+3\sum_{r=0}^{\infty}\frac{(-1)^r a^{-2r-2}}{(2r+1)(2r-1)}\prod_{n=0}^{r}[1+(n\gamma^{-1})^2]. \quad \text{(A5)}$$

This is the result we needed to prove (36).

PHYSICAL REVIEW VOLUME 112, NUMBER 1 OCTOBER 1, 1958

Superconductivity and Ferromagnetism in Isomorphous Compounds

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(Received June 13, 1958)

Isomorphous germanides of some of the rare earth metals are observed to become either ferromagnetic or superconducting. It is concluded that there is a close relationship between the two phenomena.

Since the discovery of ferromagnetism in $ZrZn_2$,[1] it has become increasingly more likely that the relation between superconductivity and ferromagnetism may be a much closer one than had until now been anticipated. We have recently found a number of isomorphous compounds which are either superconducting of ferromagnetic and which illustrate this point of view further. These compounds are being formed between elements of the third column of the periodic system and either germanium or silicon. Superconductivity or ferromagnetism was discovered in the germanides listed in Table I. In Table II measurements of the corresponding silicides are reported.

Table I. Transition temperatures of rare earth germanides.

		Transition temperature	Crystal structure
$ScGe_2$	superconducting	1.30°–1.31°K	?
YGe_2	superconducting	3.8°K	tetragonal $ThSi_2$
$LaGe_2$	superconducting	1.49°K	orthorhombically distorted $ThSi_2$
		Curie point	
$CeGe_2$	ferromagnetic	~4.5°K	orthorhombically distorted $ThSi_2$
$PrGe_2$	ferromagnetic	19°K	tetragonal $ThSi_2$
$NdGe_2$	ferromagnetic	3.6°K	tetragonal $ThSi_2$

From Table II it becomes evident that if any of the silicides aside from $PrSi_2$ should ever become superconducting or ferromagnetic, this could only happen at a much lower temperature than the corresponding germanides. From this, one might ask whether an electronic configuration favorable to superconductivity is also favorable to ferromagnetism?

Table II. Transition temperatures of rare earth silicides.

		Crystal structure
$ScSi_2$	normal above 1°K	?
YSi_2	normal above 1°K	orthorhombically distorted $ThSi_2$
$LaSi_2$	normal above 1°K	tetragonal $ThSi_2$
$CeSi_2$	normal above 1°K	tetragonal $ThSi_2$
$PrSi_2$	Ferromagnetic curie point at 10.5°K	tetragonal $ThSi_2$
$NdSi_2$	normal above 1°K	tetragonal $ThSi_2$

We would like to thank Professor F. H. Spedding for the scandium metal.

[1] B. T. Matthias and R. M. Bozorth, Phys. Rev. **109**, 604 (1958).