LIST OF FIGURES

Figure
1  Block diagram of delayed coincidence spectrometer.
2  MCA channel calibration and TPHC linearity.
3  Prompt time spectrum of $^{22}\text{Na}$ source with gate settings around 72-keV and 480-keV. A lead loaded plastic scintillator for the 72-keV and a NaI(Tl) crystal for the 480-keV are used.
4  Lifetime spectrum of 68-keV state in $^{44}\text{Sc}$.
5  Lifetime spectrum of 280-keV state in $^{75}\text{As}$ (hollow dots) along with prompt time spectrum of $^{22}\text{Na}$ (solid dots) under the same energy gate settings.
6  Lifetime spectrum of 89-keV state in $^{99}\text{Ru}$.
7  Lifetime spectrum of 84-keV state in $^{170}\text{Yb}$.
8  Lifetime spectrum of 206-keV state in $^{187}\text{Re}$.
9  Lifetime spectrum of 124-keV state in $^{131}\text{Cs}$.
10 Lifetime spectrum of 134-keV state in $^{131}\text{Cs}$.
11 Lifetime spectrum of 81-keV state in $^{133}\text{Cs}$.
12 Lifetime spectrum of 77-keV state in $^{197}\text{Au}$ (hollow dots) along with prompt time spectrum of $^{22}\text{Na}$ (solid dots) under the same energy gate settings.
Figure
13 Gamma-ray singles spectrum of $^{99}$Rh in the energy region 0-443 keV obtained with a Ge(Li) detector (livetime 60 min).

14 Gamma-ray singles spectrum of $^{99}$Rh in the energy region 443-1208 keV with a Ge(Li) detector (livetime 600 min).

15 Gamma-ray singles spectrum of $^{99}$Rh in the energy region 1208-1749 keV obtained with a Ge(Li) detector (livetime 1200 min).

16 Gamma-ray singles spectrum of $^{99}$Rh in the energy region 1749-2059 keV obtained with a Ge(Li) detector (livetime 1800 min).

17 Block diagram of Ge(Li)-Ge(Li) slow-fast coincidence spectrometer.

18 The spectrum of $\gamma$-rays in the region 0-511 keV coincident with the 322-keV $\gamma$-ray recorded with a Ge(Li)-Ge(Li) fast-slow assembly.

19 The spectrum of $\gamma$-rays in the region 0-941 keV coincident with the 353-keV $\gamma$-ray recorded with a Ge(Li)-Ge(Li) fast-slow assembly.

20 Level scheme of $^{99}$Ru. Dashed lines shown are new transitions.
21 Arrangement of magnet and detectors.

22 Decay scheme of $^{187}\text{W} (24\text{h}) \rightarrow {^{187}\text{Re}}$.

23 Time differential perturbed angular correlation spectra of $^{187}\text{Re}$ in an external magnetic field of 7 KOe.

24 $R(t)$ vs time $t$ plotted for the TDPAC spectra of $^{187}\text{Re}$ in an external magnetic field of 7 KOe.

25 The Fourier transforms of $R(t)$ for $^{187}\text{Re}$ in an external magnetic field of 7 KOe.

26 Decay scheme of $^{44}\text{Ti} (^{47}\text{K}) \rightarrow {^{44}\text{Sc}}$.

27 Time differential perturbed angular correlation spectrum of $^{44}\text{Sc}$ in an external magnetic field of 7 KOe.

28 $R(t)$ vs time $t$ plotted for the TDPAC spectra of $^{44}\text{Sc}$ in an external magnetic field of 7 KOe.

29 The Fourier transforms of $R(t)$ for $^{44}\text{Sc}$ in an internal magnetic field of 7 KOe.

30 Magnetic hyperfine fields at solute nuclei in iron matrix plotted vs the atomic number $Z$ of the solute atom. Open circles indicate that the sign of the field has not been directly measured.
Figure

31 Magnetic hyperfine fields at solute nuclei in cobalt matrix plotted vs the atomic number $Z$ of the solute atom. Open circles indicate that the sign of the field has not been directly measured.

32 Magnetic hyperfine fields at solute nuclei in nickel matrix plotted vs the atomic number $Z$ of the solute atom. Open circles indicate that the sign of the field has not been directly measured.

33 Calculated polarization $P_i$ of the $S$-electrons at the impurity site as a function of the valence $Z_i$ of the impurity atom. Curve 'a' represents the estimate of Daniel and Friedel; Curve 'b' represents the estimate of Campbell. For iron $P_h = 1$.

34 $R(t)$ vs time $t$ for the TDPAC spectra of $^{187}\text{ReNi}$ in an external polarizing magnetic field of 2 K0e.

35 The Fourier transforms of $R(t)$ for $^{187}\text{ReNi}$ in an external polarizing magnetic field of 2 K0e.

36 $R(t)$ vs time $t$ for the TDPAC spectra of $^{44}\text{ScFe}$ in an external polarizing magnetic field of 3 K0e.

37 The Fourier transforms of $R(t)$ for $^{44}\text{ScFe}$ in an external polarizing magnetic field of 3 K0e.