Key features and examples of Hall software

1.1 Software basics

1.2 Software examples

1.3 Database

1.4 Plot programs

1.5 Cryo system

3.1 Hall software structure

3.2 Modular structure for Hall hardware control

3.3 Hall basics

3.4 Some specials

3.5 Drift correction

3.6 Collinear four-point probe

3.7 Seebeck (thermoelectric) Effect

1.1 Software basics

- Modular software (Base, Dlts, Hall program modules)
- Software for Windows 9X, NT, 2000, XP, Vista, 7
- Entire hardware is software controlled
- High flexibility and easy use
- Routine and enhanced software
- Input/function restriction by selection of a user class
- Init files, different configurations, hot start
- Update from PhysTech homepage
- Demo programs at PhysTech homepage
- User interfaces by ASCII files or DLL (Dynamic link library)

1.2 Software examples

- Input of sample ID and contact number for database and automatic file names
- Saving of all measure data in binary or ASCII files
- Print out of relevant plots and results on one paper sheet
- Input of material parameters, definition of new materials
- Automatic and manual measurements
- Monitoring of commands and report files for diagnose
- Simulation of measurements available (training, demo)
- Personal style of software available (size, buttons, font ...)
- WebView for watching measurement via internet/intranet

1.3 Database

- Database files:
  - File database as a report of measured files
  - Evaluation database for results, saving by user
    - Standard DBase IV
    - User database, format select by user
    - DLL interface for saving in a customer database
  - Library (only Dlts)
- Export of DBase IV databases to ASCII, HTML, Paradox, Access, Excel, SQL-Server and user defined by ADO
- Program module for view, search and sort
- SQL commands available

1.4 Plot programs

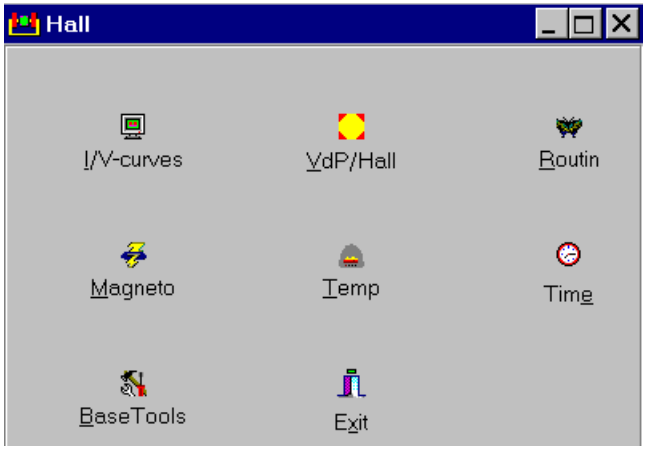
- Standard plot program: size, symbols, colors, axis, zoom ...
- Application plot program: combined plots, many curves/layers
- Edit plot program: edit data
- Presentation plot program: manual many curves/layers, text, ...
- Export to BMP, PCX, GIF, JPEG, WMF, EMF, HPGL, PLT, EPS, DXF, CSV, ASCII, XLS
- Evaluation (if available) by manual or auto linear regression
- Interpolation and smoothing by Splines, Gauss, polynom ...
- List of data in a data sheet
- Print out on half (top/bottom), one or more paper sheets

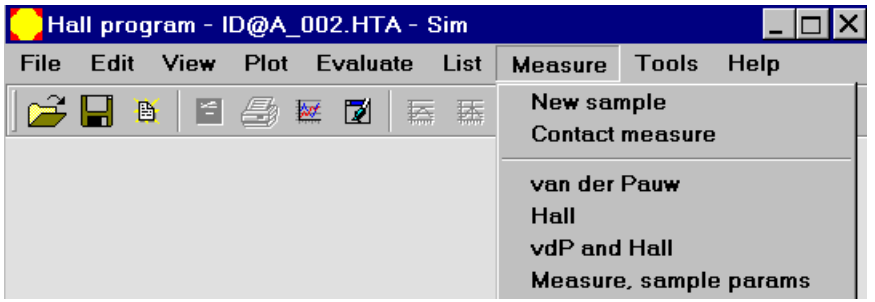
1.5 Cryo system

- Support of many cryo systems resp. temperature controllers
- All cryo system parameters in special ASCII init file
- Simple makro language for adaptation of controller commands
- User defined DLL possible
- Ramp modes:
  - Boxcar ramp, computer controlled
  - Linear ramp, computer controlled
  - Linear ramp by temperature controller, if available
- All ramp params (waiting time, delta T...) user defined
- Temperature depending PID params, if PID available
- Functions for adaptation and check

3.1 Hall software structure

- Main modules (similiar structure):
  - IV-curves
  - VdP/Hall
  - Routin (quick control, easy, guest)
  - Magneto resistance
  - Tempscan, Timescan, UserXScan
  - Base tools (calibration)
- Contact measure
- Plot, Database, ...



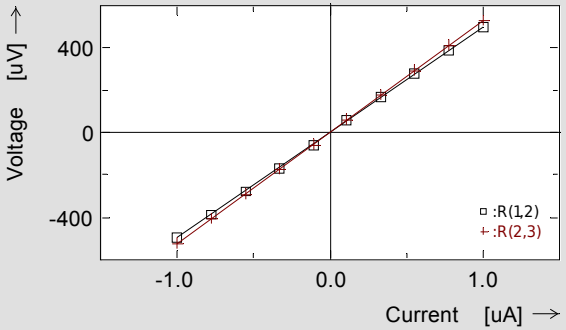


3.2 Modular structure for Hall hardware control

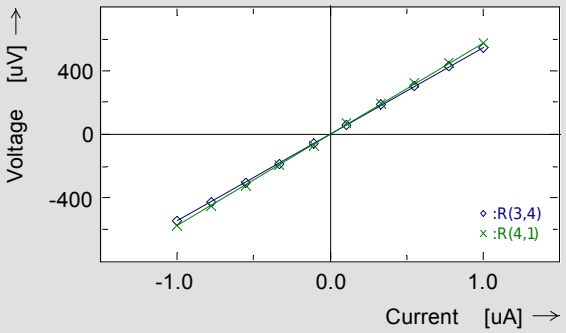
- All hardware parameters in special ASCII init file
- Commands by simple makro language or DLL
- Predefined for 68k-, USB measure system, Keithley devices
- Modular structure:
  - Magnet field (direct commands or voltage control)
  - Current source
  - Voltage measurement
  - Contact matrix
  - Cryo system
  - Others (LED light)

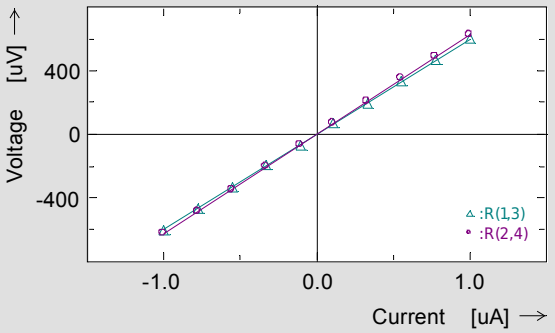
3.3 Hall basics

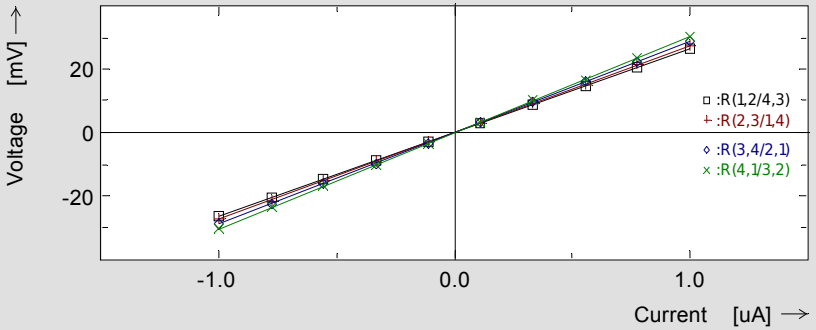
- Sample types:
  - VdP (van der Pauw)
  - Barshape
  - Collinear 4-point
- 2 point resistivity contact check measurement
- 4 point resistivity vdP and Hall measurements
- 2 independent measurement configurations for Hall available
- Automatic or manual current selection (A or dest. voltage)
- Evaluations of differential resistivity by linear regression
- Hall measurements at 2 or many fields (R/B curve)
- Results: Rho, Concentration, Mobility, Ns(Rho), SymetryFactor
- Print out of relevant plots and results on one paper sheet

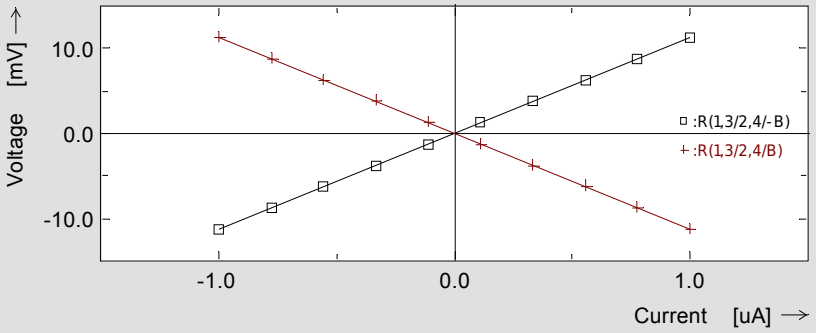


Name	=	ID@A_001.HTA			
ID	=	ID	rcID	=	1001
Date	=	14.07.2008	Type	=	n-Si-vdP
Thick.	=	1.00 um	Temp	=	270.00 K
Field	=	0.00 T			
R(1,2)	=	5.00E+02	R(2,3)	=	5.25E+02 Ohm
R(3,4)	=	5.50E+02	R(4,1)	=	5.75E+02 Ohm
R(1,3)	=	6.00E+02	R(2,4)	=	6.25E+02 Ohm





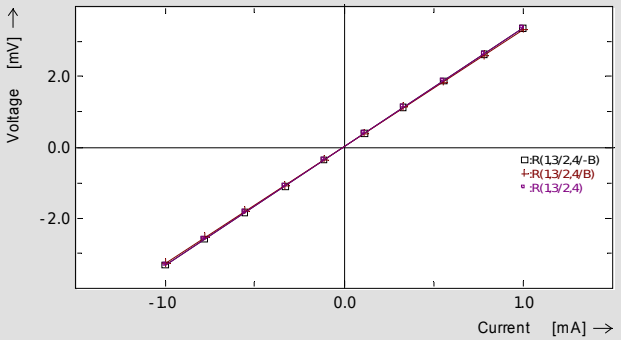


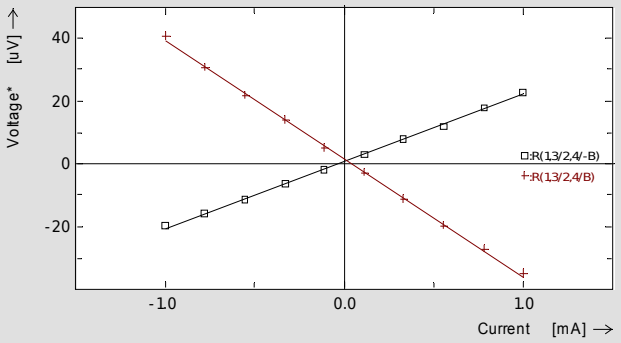


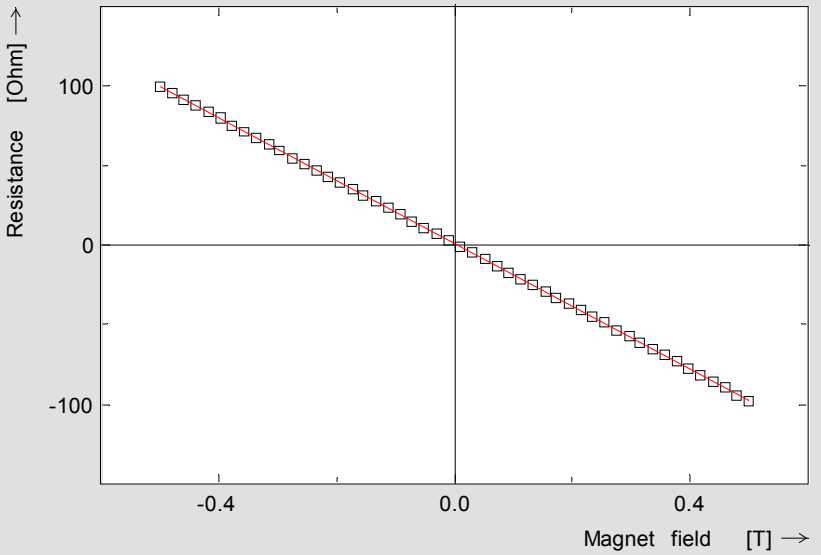
Name	=	@A_001.HTA	
ID	=	ID	
rcID	=	1001	
Date	=	14.07.2008	
Type	=	n-Si-vdP	
Thick.	=	1.00	um
Temp	=	270.00	K
Field	=	0.55	T
Rho	=	1.27E+01	Ohm*cm
Rho'	=	1.27E+05	Ohm
Sym	=	1.05E+00	
F	=	1.00E+00	
Rh	=	-2.05E+04	cm^3/As
Rh'	=	-2.05E+08	cm^2/As
n	=	3.04E+14	cm^{-3}
my	=	1.61E+03	cm^2/Vs

3.4 Some specials

- Misaligment voltage compensation
- Classic Hall measurements available
- All measurements can be performed at different temperatures, evaluations as a function of temperature
- Hall resistance and resistivity as a function of magentic field

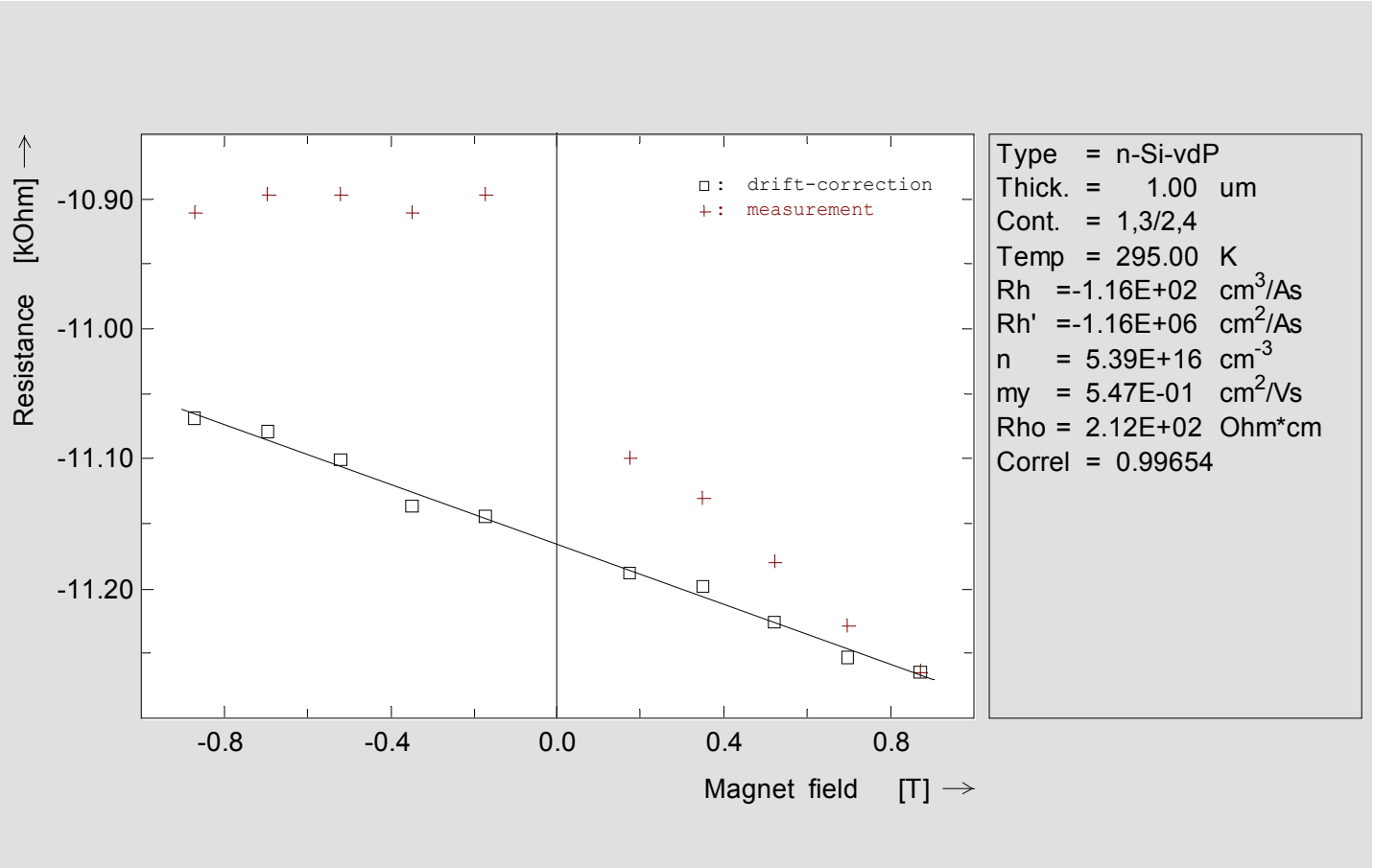






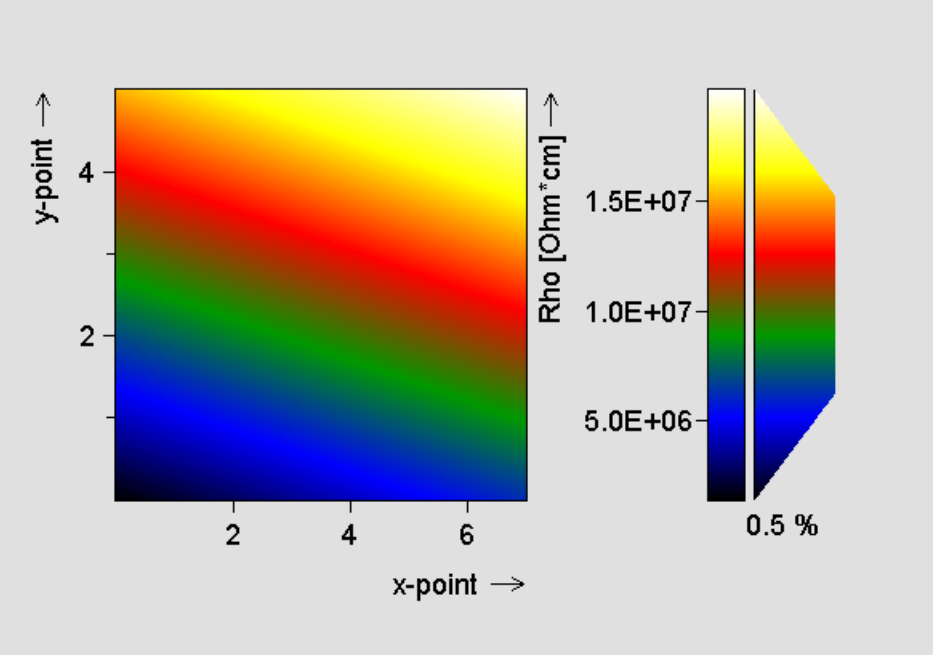
3.5 Drift correction

- New measurement technique to minimize 'noise drift' for high sensitivity
- Special measurement/evaluation for correction of slow linear drift voltages of sample



3.6 Collinear four-point probe

- Different measurement techniques
- Various corrections
- Results for Rho and Rho-Sheet
- Scanning available



3.7 Seebeck (thermoelectric) Effect

- Measurement of Seebeck coefficient Kapa from Seebeck voltage U_S versus some temperature differences Delta_T
- Measurement at different temperatures yields to curve Kapa versus temperature