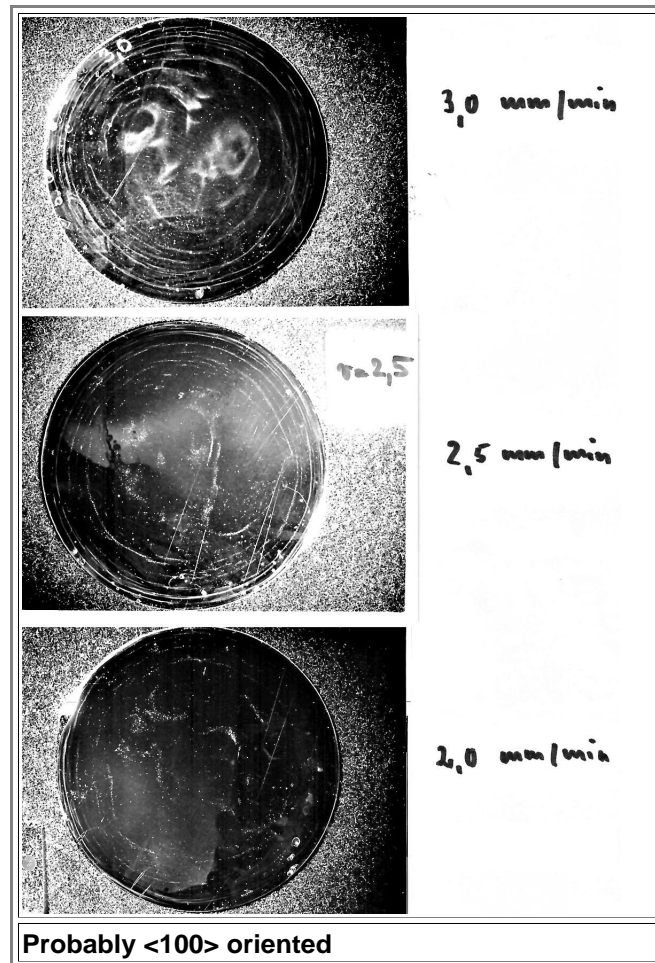


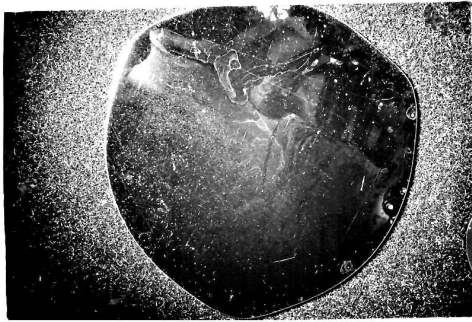
## Pictures to: 2.3 Swirl Defects in Si (Investigated in a HVTEM)

### Part 3

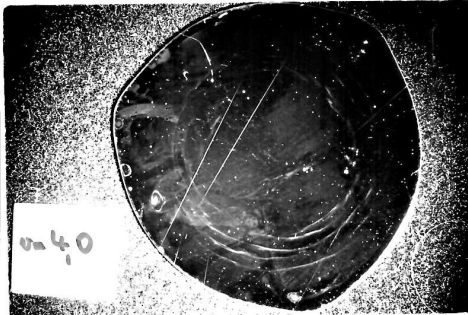
Months after I thought I was done with archiving the swirl work, I found another file full of pictures not yet selected. Here is a small number of these finds.

First, a few optical pictures showing the swirl pattern on our 33 mm **FZ** crystals. The pulling speed is also indicated.





4,5 mm/min



4 mm/min

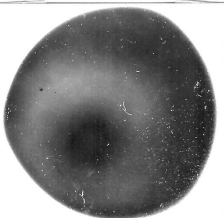


3,5 mm/min

Probably 111 > oriented

B 362 II <111>

Swirl <111>



$v = 4,0 \text{ mm/min}$

$n_c \approx 1,7 \cdot 10^{16} \text{ cm}^{-3}$   $n_0 \approx 0,8 \cdot 10^{16} \text{ cm}^{-3}$

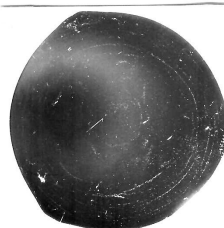
1 cm



$v = 3,0 \text{ mm/min}$

$n_c \approx 2,0 \cdot 10^{16} \text{ cm}^{-3}$   
 $n_0 \approx 0,8 \cdot 10^{16} \text{ cm}^{-3}$

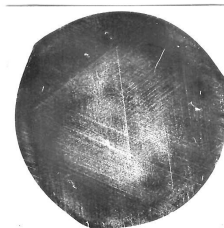
3 cm



$v = 2,0 \text{ mm/min}$

$n_c \approx 2,0 \cdot 10^{16} \text{ cm}^{-3}$

14 cm

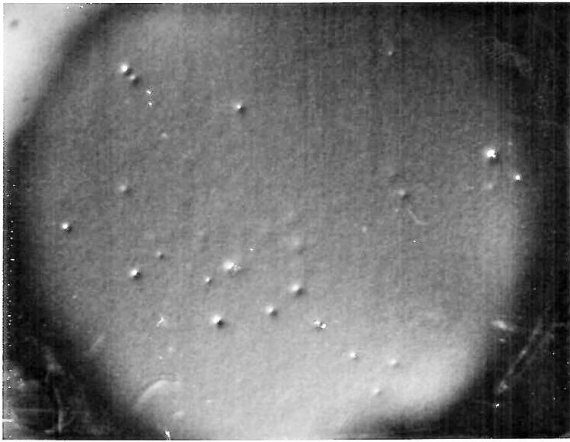
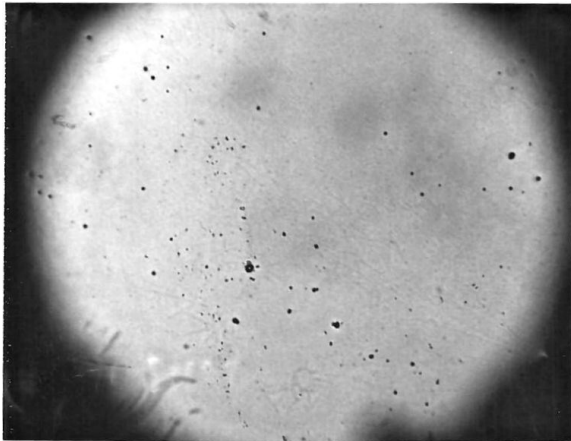


$v = 1,5 \text{ mm/min}$

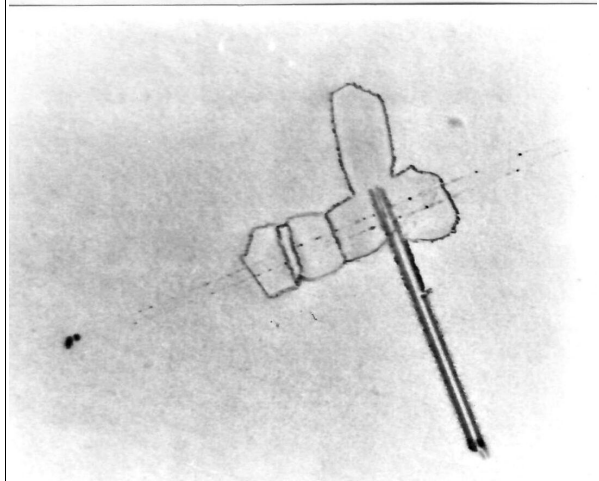
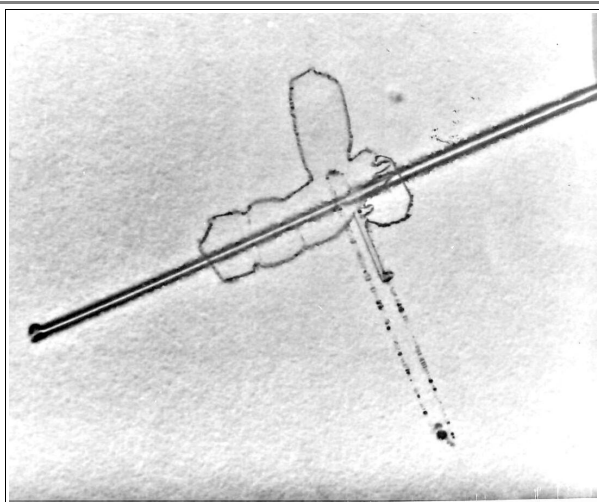
16 cm

**At the lowest growth speed dislocations were generated**

One more example to specimens preparation

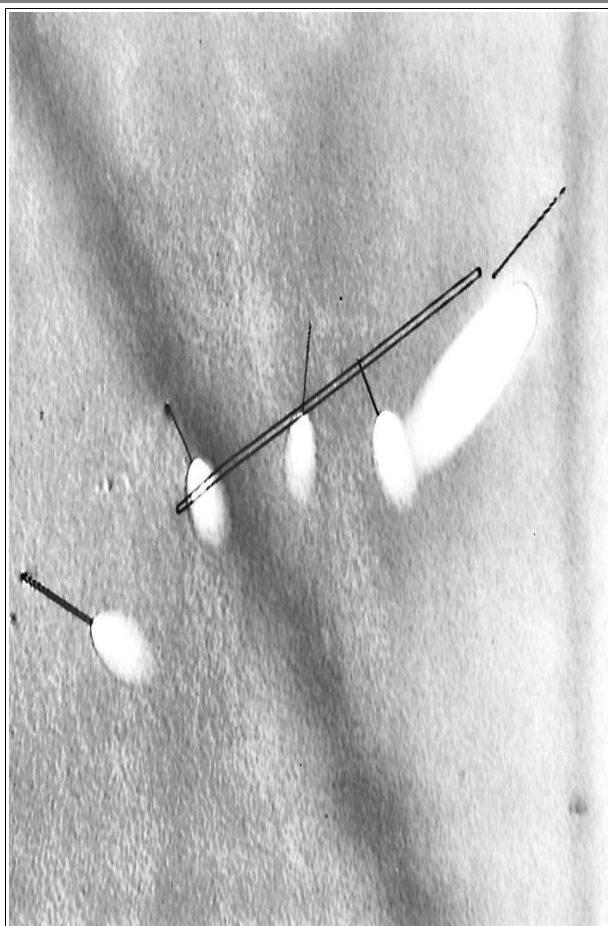


**Top: 2.3 mm diameter specimen, through-light view**  
**Bottom: Looking at the surface**



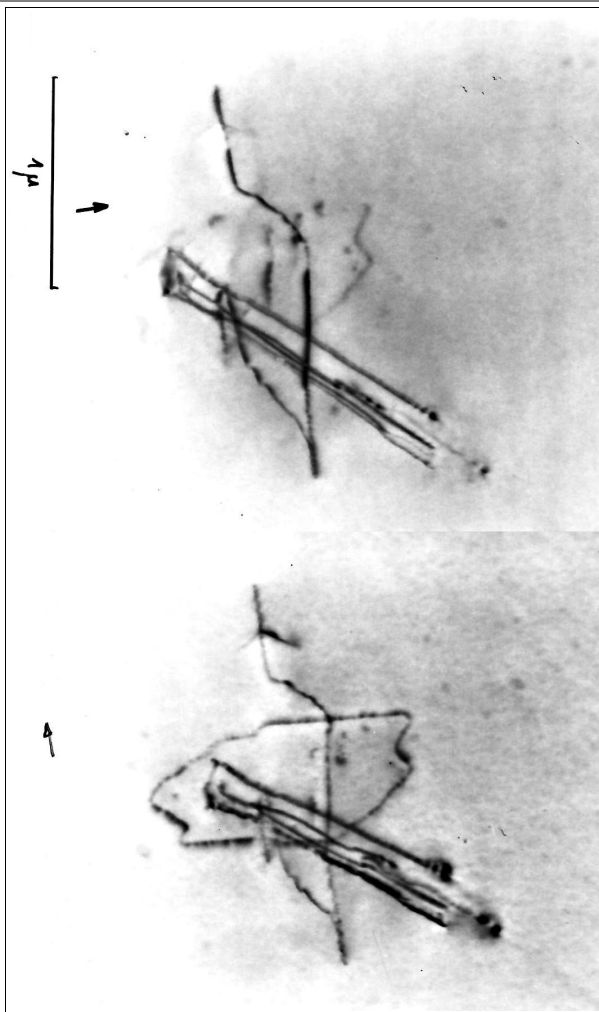
**Huge defect shown at two different diffraction conditions.**

Here, as in other examples, the very long and straight dislocations dipoles are decorated by second order agglomerates.



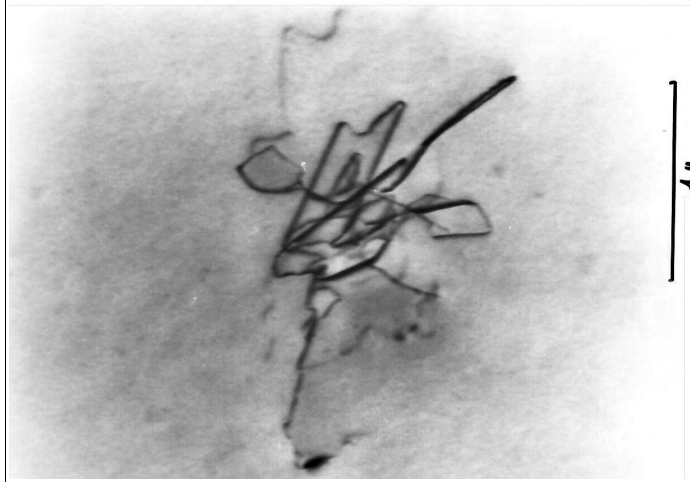
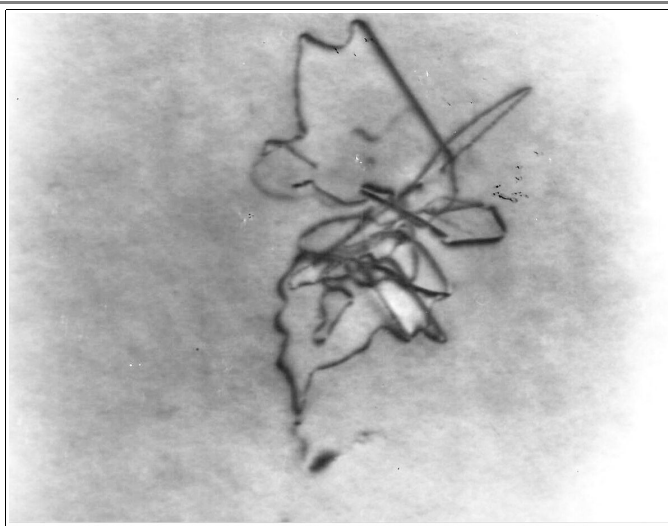
**A rather weird assembly**

Of course, the major part of this defect might have been etched out by specimen preparation, witness the etch pits.



**Complex defect shown at two different diffraction conditions.**

A simple unfaulted loop seems to be at the heart of the defect..



**Complex defect shown at two different diffraction conditions.**

Here are the links to the rest

[Swirl pictures](#)

[Part 1](#)

[Part 2](#)