

E - 21

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June, 2024

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1 Tube

- Group: 8;
- Length: 48cm;
- External diameter: 15mm;
- Thickness: 1,85mm;
- Objective: study the anti-resonance light guidance phenomena.

2 1st pulling

- There isn't a 1st pulling for this sample.;
- It is drawn directly to a fiber.

3 2nd pulling

Temperature [°C]	Time [min]
120	30
150	30
170	30
190	5
200	2

Table 1: Temperature ramping for the 2nd pulling.

- The fiber snapped while pulling the band D;
- It happened since this sample is a capillar and has a very thin wall, so given very low resistance to the fiber during the process of fabrication;
- An overview of the whole pulling is shown in Fig. 1;
- Fine bands: A and C;
- Transition bands: B and D.

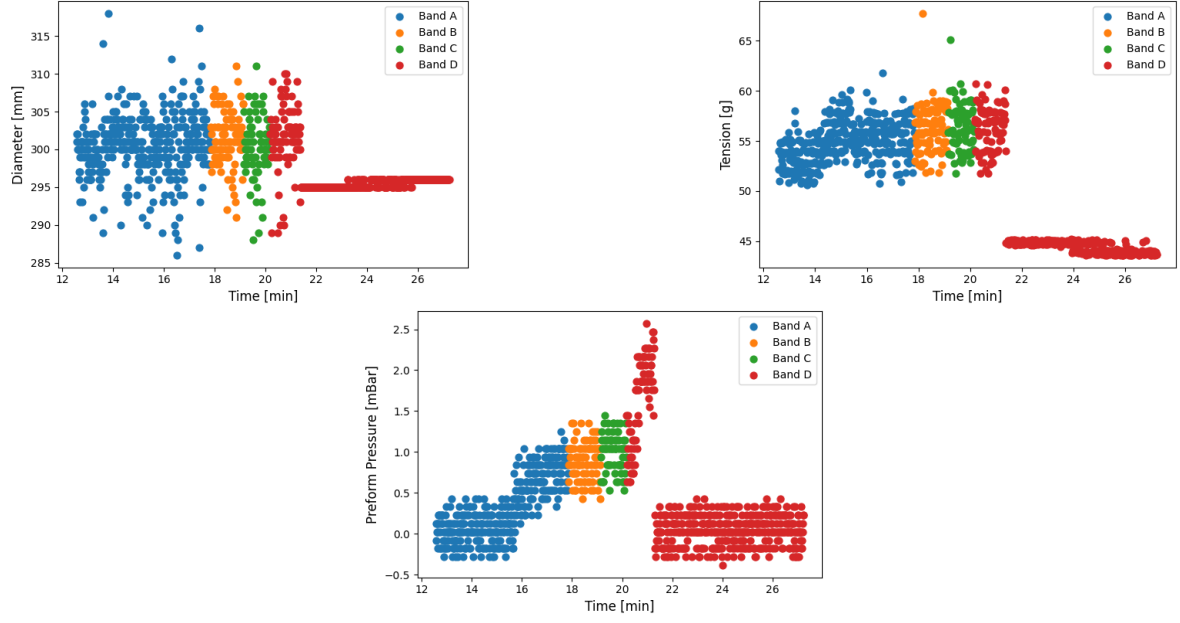
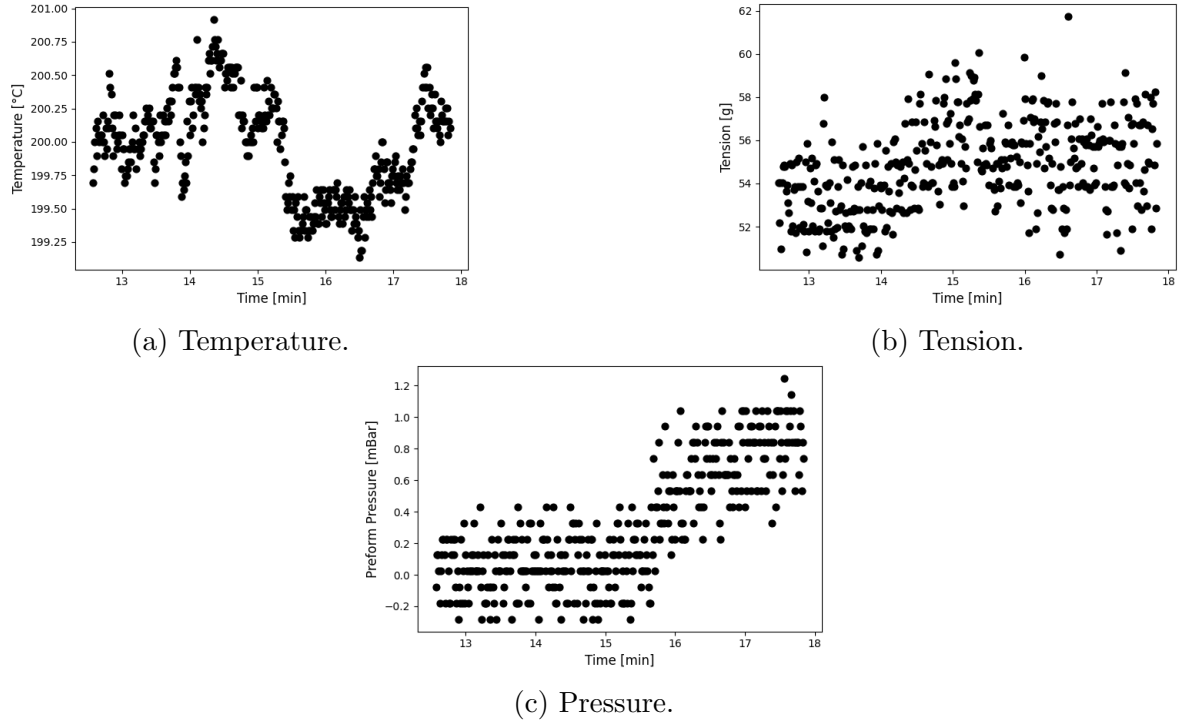


Figure 1: Comparison between the bands.

3.1 Band A

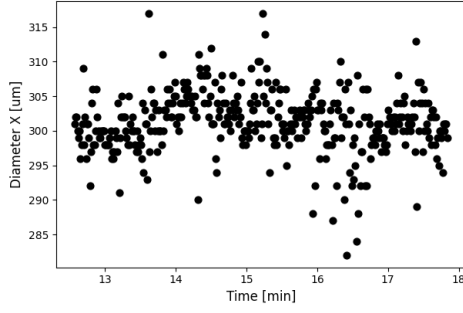


(a) Temperature.

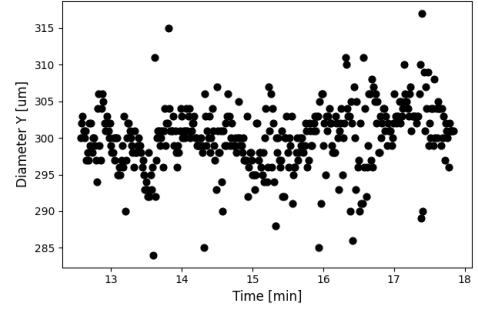
(b) Tension.

(c) Pressure.

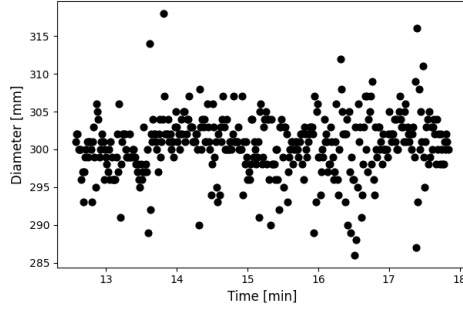
Figure 2: Intensive parameters.



(a) Diameter in X.

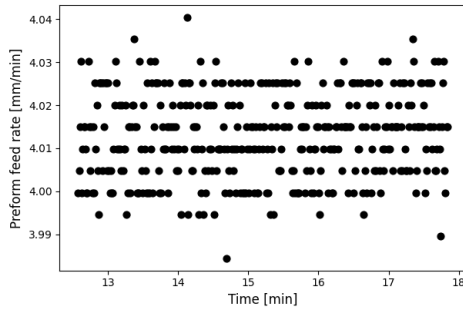


(b) Diameter in Y.

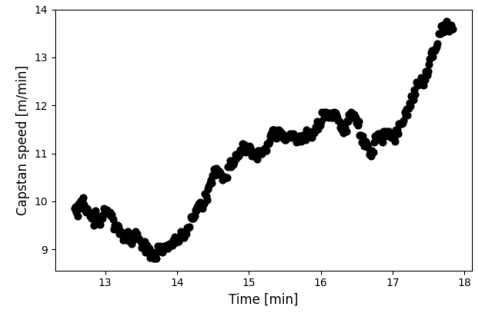


(c) Mean diameter.

Figure 3: Diameters.



(a) Feed speed.



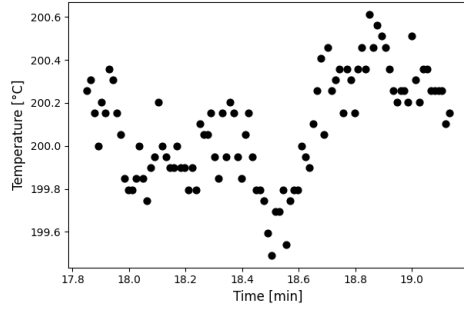
(b) Capstan speed.

Figure 4: Speeds.

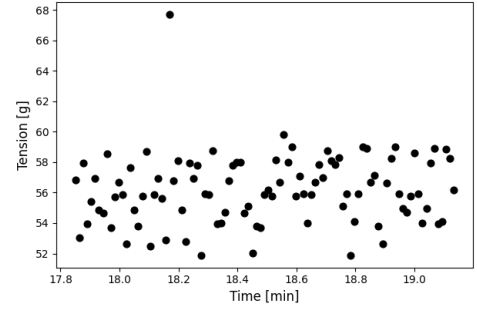
Parameter	Mean	Standard deviation
Temperature [°C]	199,97	0,38
Tension [g]	54,76	2,02
Pression [mbar]	0,31	0,38
Diameter [μm]	300,51	4,03

- The diameter stabilized in $300\mu m$;
- No pressure was applied inside the fiber.

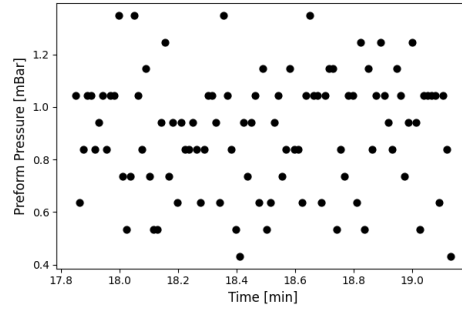
3.2 Band B



(a) Temperature.

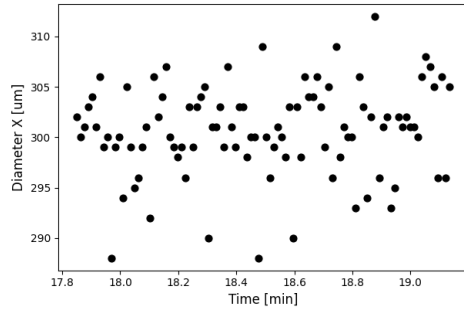


(b) Tension.

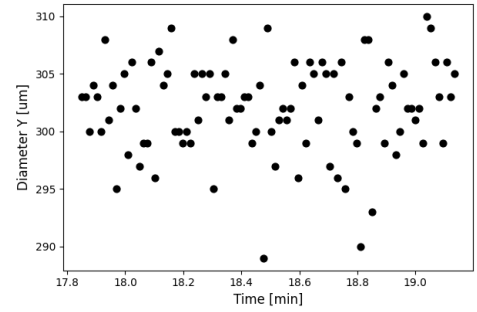


(c) Pressure.

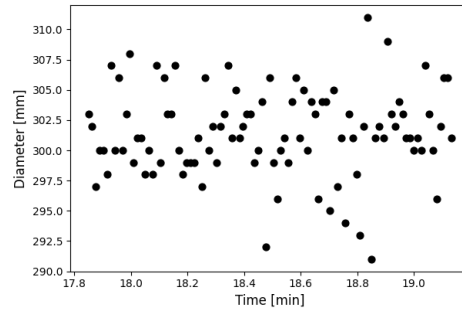
Figure 5: Intensive parameters.



(a) Diameter in X.

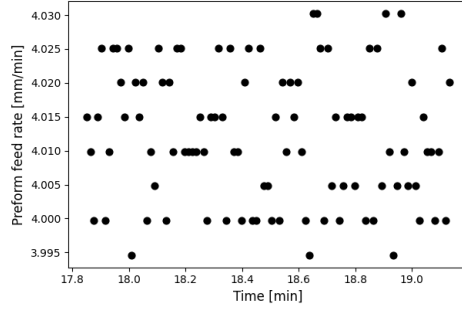


(b) Diameter in Y.

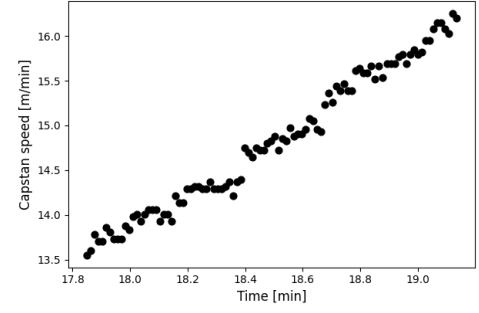


(c) Mean diameter.

Figure 6: Diameters.



(a) Feed speed.



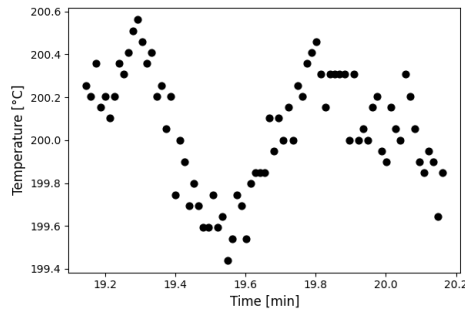
(b) Capstan speed.

Figure 7: Speeds.

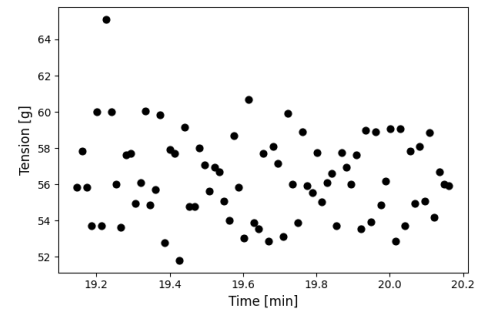
Parameters	Mean	Standard deviation
Temperature [°C]	200,09	0,25
Tension [g]	56,18	2,28
Pressure [mbar]	0,90	0,22
Diameter [um]	301,40	3,62

- Transition band;
- I applied pressure of *1mbar*;
- I waited for the diameter and pressure stabilize to change to the next band.

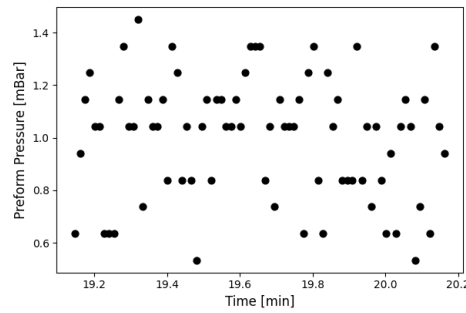
3.3 Band C



(a) Temperature.

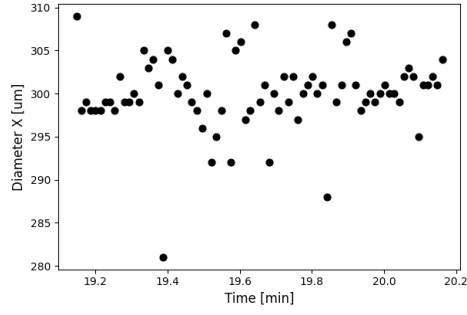


(b) Tension.

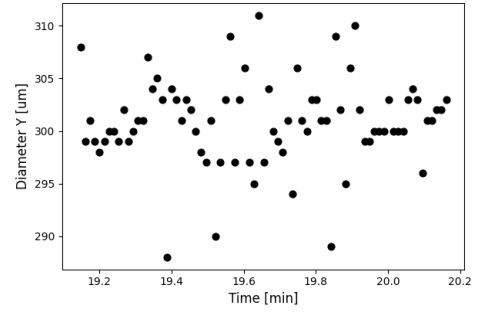


(c) Pressure.

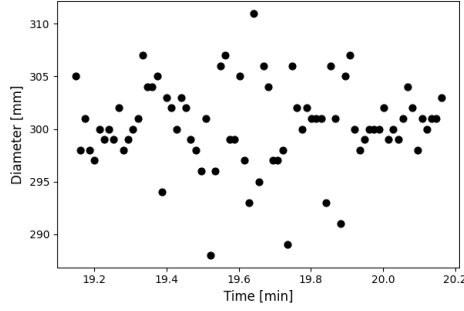
Figure 8: Intensive parameters.



(a) Diameter in X.

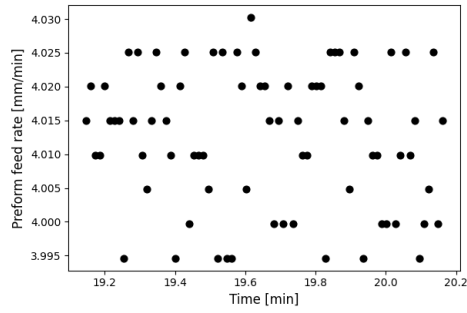


(b) Diameter in Y.

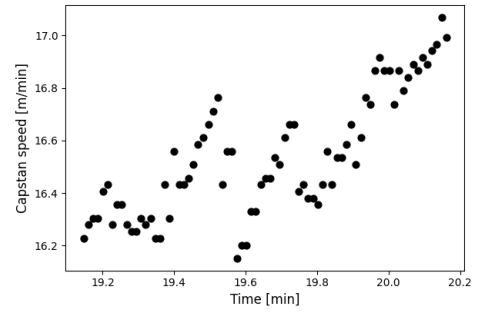


(c) Mean diameter.

Figure 9: Diameters.



(a) Feed speed.



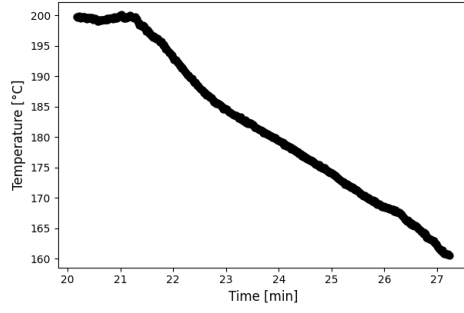
(b) Capstan speed.

Figure 10: Speeds.

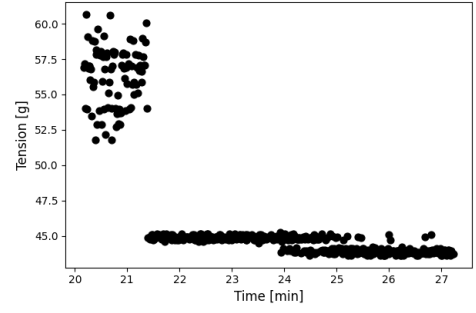
Parameter	Mean	Standard deviation
Temperature [°C]	200,05	0,27
Tension [g]	56,39	2,36
Pressure [mbar]	1,00	0,23
Diameter [um]	300,34	4,04

- Diameter stabilized in 300μ ;
- The pressure stabilized in $1mbar$.

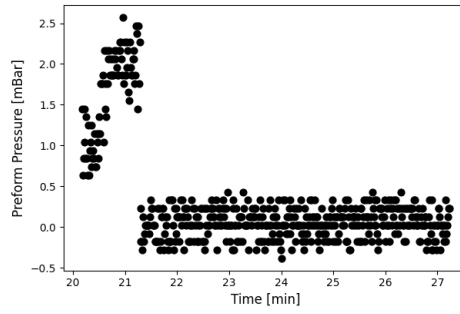
3.4 Band D



(a) Temperature.

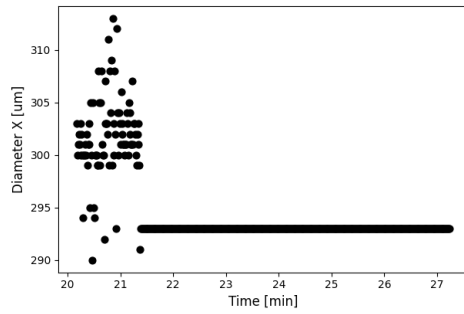


(b) Tension.

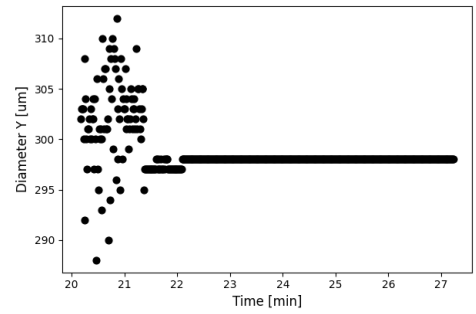


(c) Pressure.

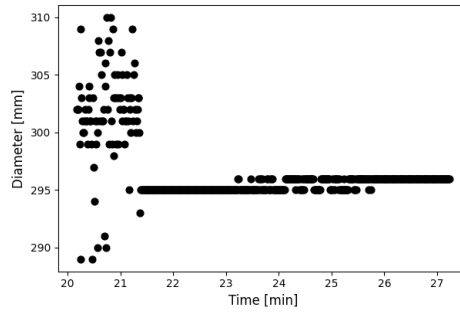
Figure 11: Intensive parameters.



(a) Diameter in X.

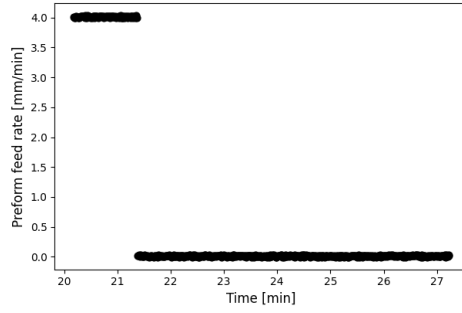


(b) Diameter in Y.

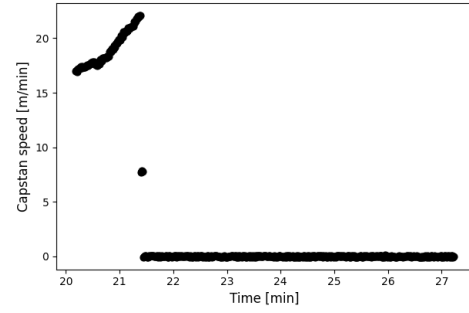


(c) Mean diameter.

Figure 12: Diameters.



(a) Feed speed.



(b) Capstan speed.

Figure 13: Speeds.

- Transition band;
- I applied pressure of 2mbar ;
- I got a few meters of fiber;
- It snapped after the pressure achieved $2,5\text{mbar}$ due to the pressure pump variation;
- It is clear from the tension graphic the fiber snapped between minutes 21 and 22;
- Right before the snapping, the fiber started to make a noise while passing through the capstan system;
- It happened since the fiber was too fragile after expanding by the N_2 gas pressure.