

# Status of pn offset calculation method 1/4

## Introduction

- Offset is measured & calculated in **blocks of 4 lines**  
lowest and highest 3 values/pixel are discarded
- Two methods used so far
  1. Old method (slow method)
    - common mode correction **off**
    - offset is average of **94** frames
  2. New method (fast method)
    - common mode correction **on**
    - offset is average of **24** frames

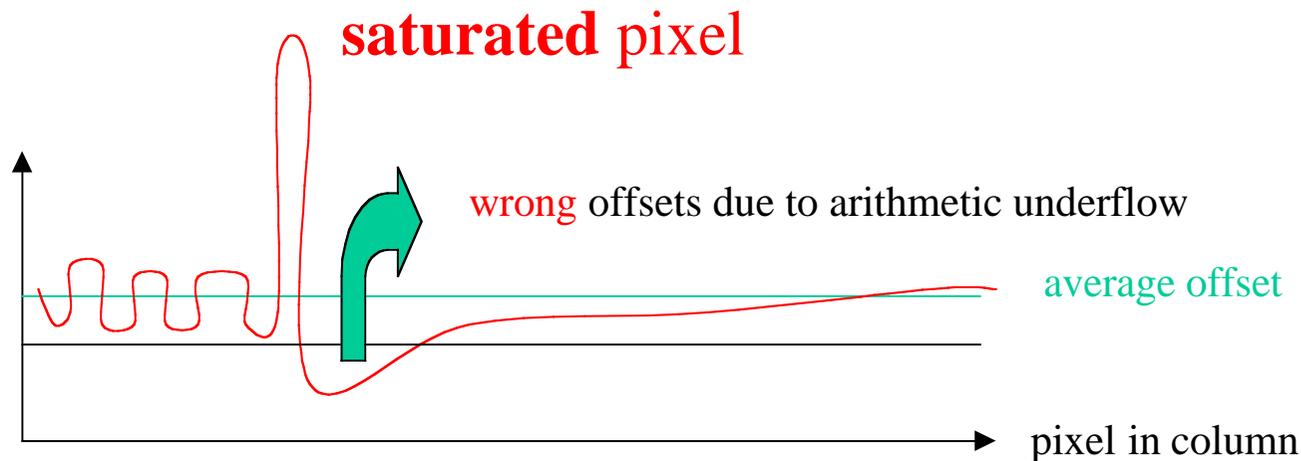
## Status of pn offset calculation method 2/4

### General problem:

- large charge packet ( $\gg 3000$  ADU) saturates CAMEX channel  
⇒ next pixels of column show low readings

### two cases:

- very bright pixels (occurred after „micro meteorite“ event)
- highly ionising particles



# Status of pn offset calculation method 3/4

„Snow“ on pn images



20 - 30 ADU



30 - 40 ADU

## Explanation:

Highly ionising particles produce tracks of lower values for more than one frame

- patchy offset map (difference some eV),
- patches have **lower** values,
- **lower** offset is subtracted during event processing

➔ locally **lower** threshold

➔ locally **higher** eventrate

## Status of pn offset calculation method 4/4

During commissioning we had tried to minimise depth of these patches

→ new method with wait (3 for FF, LW, SW; 2 for ext.FF)

**But:** new method produces **noisy tracks** downstream of very bright pixels

**Decision: use old method** (see table)

## Proposed **new**/ old settings for XMM-Newton pn-CCD camera

23.01.01 E.Ke

Mode	Offset Calculation			LowerThresh. in ADU (commanded value)	MIP reduction
	Method	# Frames used (# frames com.)	Chop.		
<b>Full Frame</b>	Median corr. <b>on</b>	24 (30)	3	20 (532)	Mip columns + <b>2</b> l/r col Mip columns + <b>1</b> l/r col
	Median corr. <b>off</b>	<b>94 (100)</b>	<b>0 (20% faster)</b>		
<b>Ext. Full Frame</b>	Median corr. <b>on</b>	24 (30)	2	20 (532)	Mip columns + <b>2</b> l/r col Mip columns + <b>1</b> l/r col
	Median corr. <b>off</b>	<b>94 (100)</b>	<b>0 (10% slower)</b>		
<b>Large Window</b>	Median corr. <b>on</b>	24 (30)	3	20 (532)	Mip columns + <b>2</b> l/r col Mip columns + <b>1</b> l/r col
	Median corr. <b>off</b>	<b>94 (100)</b>	<b>0 (20% faster)</b>		
<b>Small Window</b>	Median corr. <b>off</b> <b>No changes</b>	94 (100)		20 (532)	NO
<b>Timing</b>	Median corr. <b>off</b>	94 (100)	31	40 (552) <b>30 (542)</b>	NO
<b>Burst</b>	Median corr. <b>off</b> <b>No changes</b>	94 (100)		23 (535)	NO

Energy scale: **1 ADU ~ 5 eV**

In **Timing Mode** there are only **9 columns** for **source** and **9 columns** for **background** transmitted